ELECTRICAL REVIEW

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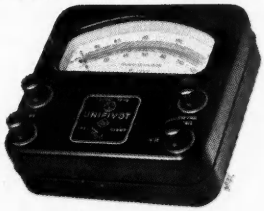

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ELECTRICAL
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THE OLDEST ELECTRICAL PAPER ● ESTABLISHED 1872

Nationalized Industries

SAFEGUARDS FOR THE PUBLIC

HOW can the nationalized industries be so supervised as to ensure that they operate in the public interest? And how can supervision be exercised without detrimental interference in their operation? This was the broad subject discussed in the House of Commons last week. In opening the debate Mr. Herbert Morrison outlined the existing opportunities for members to discuss the operations of the national Boards. He warned the House that too much Ministerial interference with management and Parliamentary discussion of day-to-day operations would lead to a "Civil Service" spirit in the nationalized industries which was not consonant with the management of commercial services.

Possible Methods

General debates in the House on nationalized industries are of too varied and of too political a character to be very fruitful. The appointment of Select Committees to watch the Boards has been suggested but that, too, would probably lead to nervousness, irritation and hesitation and would be a very doubtful means of securing efficiency. The employment of outside business consultants has possibilities and Mr. Morrison mentioned with approval the useful advice given by quasi-independent part-time members of some Boards.

Under several of the nationalization measures consumers' councils have been set up. Whether these councils really achieve what they are intended to do was questioned by a number of members: the *Electrical Review* has expressed doubts of their effectiveness from time to time. Decentralization or regionalization were considered by Mr. R. A. Butler and other speakers to be desirable as a means of stimulating healthy rivalry.

Seven-Year Inquiries

It was suggested by Mr. Morrison that a periodical inquiry should be made into each Board's work, as in the case of the B.B.C.; he thought that seven years would be a suitable period. Later, Mr. Noel-Baker in winding up the debate made it clear that this was a definite announcement of Government policy and was thus the only practical outcome of the six-hour discussion.

The debate has left us wondering if it is possible to devise any general system to ensure that the public is given the best possible service at a reasonable price. Mr. Morrison's seven-year inquiry proposal involves letting things run on too long; such inquiries, as Mr. Oliver Lyttelton suggested, may be in the nature of examination of the stable door long after the horse has bolted. We are not sure about all nationalized services

but so far as electricity is concerned we have faith in those responsible for it. The conditions under which they work may tend to harden their arteries and their hearts but there is one thing which should save them from this fate. Although the B.E.A. and Electricity Boards have a monopoly in their particular field they are still faced with an alert competitor in the gas industry. It was suggested by one member in the course of the debate that coal, gas and electricity should not be competitive but should provide a "balanced service." That is a proposal which we will continue to combat. There could be no better way of inducing self-satisfaction and inertia in these industries than to remove the spur of the consumers' freedom of choice.

EUROPEAN GRID

Readers who are familiar with the literature of the subject will be aware that the future development of electricity supply in Europe generally and the creation of a super-grid system in Western Europe particularly have become very controversial topics. The map reproduced on another page, which is elemental, is not intended to be anything other than an evolutionary pointer, while the accompanying article, which is not an official declaration of intention, is nevertheless indicative of policy framework. Together they should help to define more exactly the standpoint from which further studies must proceed.

SINGLE-POLE SWITCHING

Some anxiety is apparently being felt by switch gear manufacturers at the tendency of Electricity Supply Boards to insist on the use of single-pole and neutral switching for new 230 V consumers' installations. This insistence involves the manufacturers in some difficulties because the demand remains substantial for both double-pole and single-pole and neutral patterns and this in a measure means the manufacture of dual lines, thus impairing production efficiency to some extent. It is perhaps a little unfortunate that, before these edicts were issued to contractors and others specifying changeover dates to the new patterns, some prior negotiations were not carried out with the manufacturing side of the industry to ensure that reasonable supplies of single-pole and neutral gear should be available. In view of the fact that much planning, modification of tools and general production problems are involved, it appears that some lag will now be inevitable before adequate supplies to meet all demands will be readily available.

WATER-MAIN EARTHING

The trend towards the use of non-conducting corrosion-resisting materials for public water systems, coupled with increasing electrical loads, it is suggested by Mr. N. Pugh, president of the Institution of Water Engineers, may bring danger to workmen engaged in repairs to the mains, to the general public, and also cause injury to the pipes. The implications of the introduction of non-metallic pipes are, however, recognized in Appendix 4 of the I.E.E. Regulations (12th edition, 1950) which sets out the agreement reached in 1938 between electrical and water interests and provides for testing for an undue leakage. Damage to mains seems much less likely now than in the past, since d.c. forms a small and rapidly declining proportion of the total public supply.

CORROSION TROUBLES

Corrosion occurs when d.c. leaves a pipe and any ill effects due to a.c. are insignificant. Although the higher settings of circuit breakers or fuses entailed by greater installation capacities may permit the passage of increased leakage currents, the risk is from fire rather than corrosion. In some places d.c. shunted from tramway rails has given trouble, which does not occur with their trolley-bus successors. Other possible electrical contributions to corrosion, for which public electricity supply cannot be blamed, are electrolytic action arising from salts in the soil and the contact of different metals.

"THE CHESTERS"

The first eight of the intended twenty-six homes being built at Malden, Surrey, by the I.E.E. for members, or their dependants, who fall upon hard times were completed in August and have been occupied, though gardeners have still to lay out their surroundings next spring when there will be a simple ceremony to mark the end of the first stage of this happily conceived scheme of benevolence. It is hoped in due course to build another "Chesters", possibly in the North of England, when capital becomes available and for that purpose the Homes Fund remains open.

Modern Cable Making

Developments at a Derby Factory

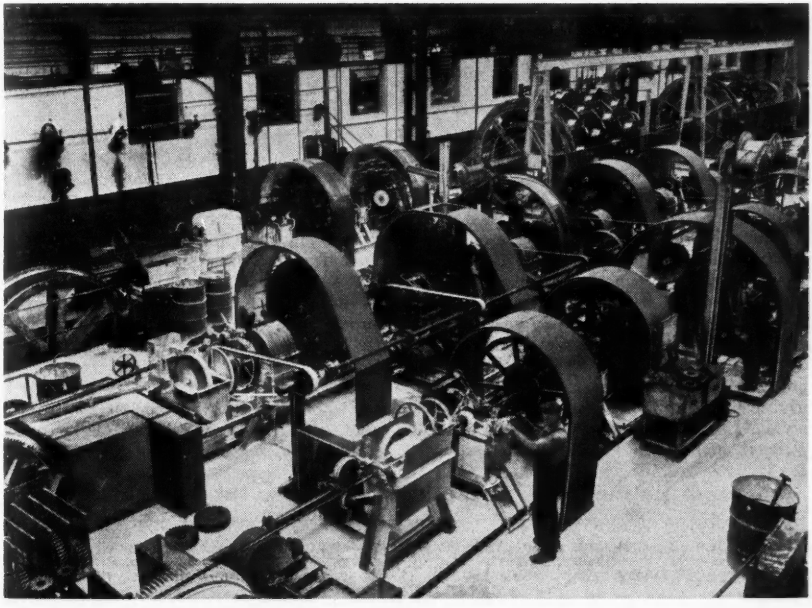
THE recent opening of the new extension for the manufacture of large rubber insulated cables has provided the occasion for us to visit the Derby Cable Works of Crompton Parkinson, Ltd., and see the various improvements in the technique of cable making that have been developed during the past few years. Although no material alterations have been made in the actual design of the cables produced, certain new manufacturing methods have been adopted and new types of machinery have been devised with the object of improving the quality of the product as well as increasing the output.

Production now covers all types of paper and rubber insulated cables up to a working pressure of 22 kV, but an extension of the range to cover higher voltages is contemplated. The factory is laid out with the wire drawing and conductor departments in the centre and the paper and rubber cable departments on each side.

Manufacture commences with the preparation of the copper rods which form the raw material for the conductors. These rods are oxide coated when received, resulting from hot rolling, and the first process at the Derby Works is the removal of the film of oxide by passing the rods on a conveyor system through a bath containing a weak solution of sulphuric acid. On leaving the tank the rods are high pressure water sprayed to remove the acid. The acid in the pickling bath is maintained at a constant strength by electrolytically removing the dissolved copper.

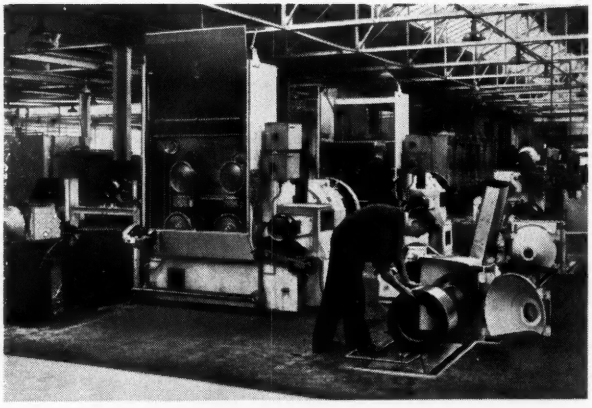
A completely new wire drawing plant has

Applying paper covering to cable at the Derby Cable Works of Crompton Parkinson, Ltd.



recently been installed, and this consists of two heavy rod machines capable of drawing down ½in diameter rod to 0·064in at speeds up to 5,000ft/min. These machines are each driven by 275 h.p. Crompton Parkinson motors. The wire is drawn on to steel spools of 1,000lb capacity.

For further reduction in size the wire is passed on to intermediate drawing machines —drawing at one mile per minute, and capable of reducing the size down to 0·018in. These machines, and the two rod machines, are controlled by automatic contactor switchgear housed in separate switchrooms. For still further reductions two small machines for drawing down to 0·0076in at a speed of 5,000ft/min are installed.



New type of vertical wire drawing machines

Annealing will be carried out in a continuous electric furnace, having automatic loading and unloading facilities. The annealed wire for paper cable conductors is wound from the 1,000lb spools on to machine bobbins on an entirely new form of winding machine in which the 1,000lb spool remains stationary during the unwinding process. The stranding machines are equipped with shaping heads which can be revolved so as to produce pre-spiral strand. Tubular high speed machines are used for the manufacture of 7 and 19 strands.

Adjacent to the large stranding shop is the bay devoted to paper lapping and laying up. The paper lapping machines are of modern type equipped with cluster type heads. Of particular interest was a high speed vertical taping machine of the company's own design. Three large laying-up machines are employed for twisting together the several cores of the cable and applying fillings of jute or other similar material. At the same time the machines are equipped for applying metallic screens to h.v. cables.

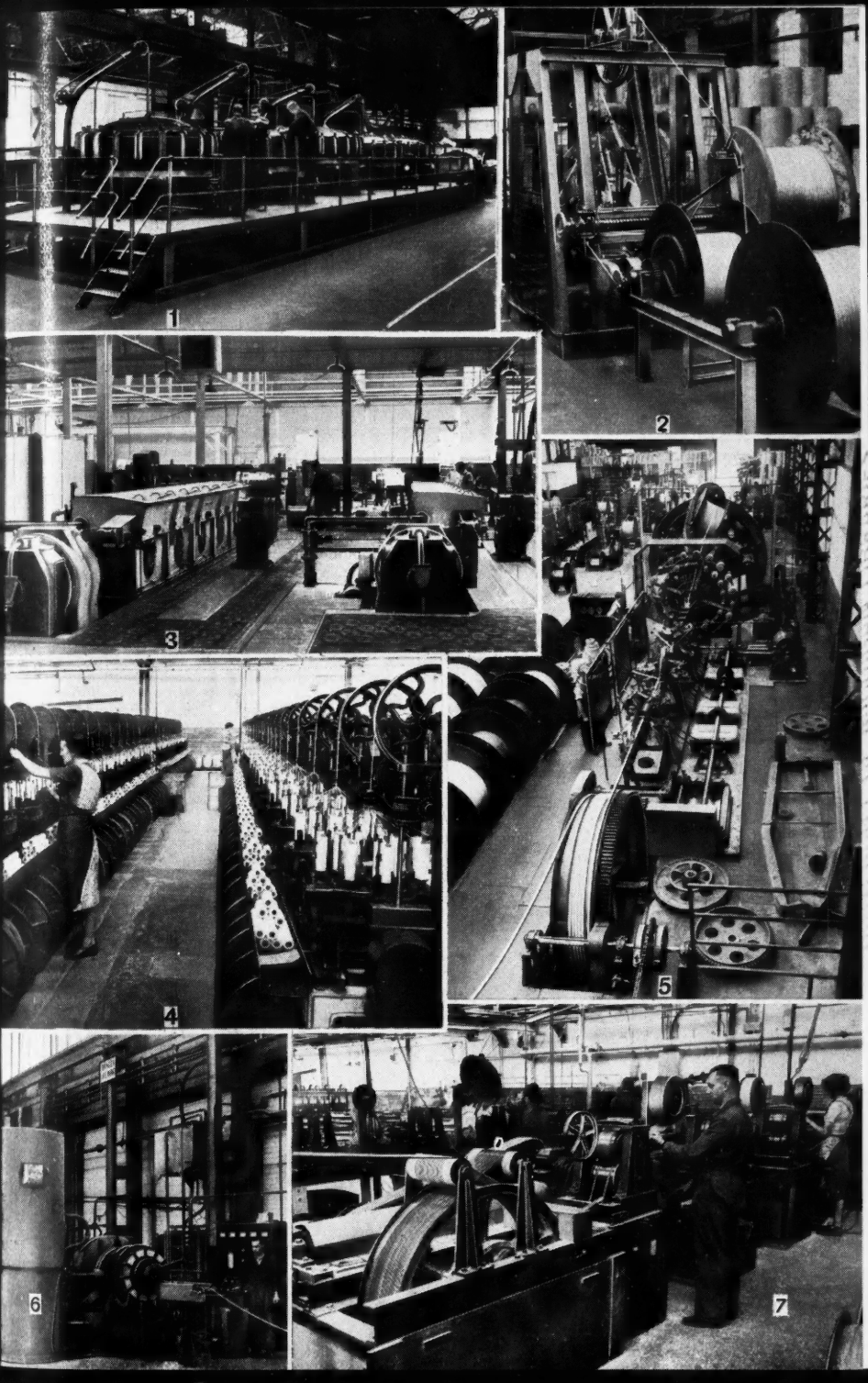
Two impregnating units are used—one for low voltage cables, the other for high voltage. In both cases the plant operates on a closed system whereby the cable upon being dried is not further exposed to the atmosphere until fully impregnated. The compound used in the impregnation plant is filtered, dehydrated and stored under vacuum.

The lead presses are hydraulically operated and work on the single ram principle. After leaving the lead press the cable is varnished in order to prevent adhesion between the layers, and also to provide the protective corrosion resisting coating.

The armouring shop is equipped with a variety of steel tape armouring and wire armouring machines. One of these machines is equipped with two carriages and carries bobbins 2ft in diameter. This machine is capable of applying two layers of armour wire at one passage of the cable through the machine. Adjoining the armouring shop is the test and despatch bay, which also provided facilities for finished cable stores.

Returning to the wire drawing department and proceeding towards the rubber cable section we first pass through the tinning department, where a number of modern tinning units are in operation. Before entering the tinning bath the wire is

See opposite page : (1) Impregnating tanks for paper insulated cables. (2) Vertical stranding machine. (3) Eleven- and nine-die horizontal wire drawing machines. (4) Two rows of 16-spindle braiding machines. (5) Laying up paper insulated cable. (6) Continuous lead covering machine. (7) Twenty-wire horizontal rubber covering machine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cleaned up by an electrolytic process. The tinned wire is collected on to bobbins which can be placed directly in the stranding or bunching machines which form the next operation.

Fine wire stranding and bunching is performed on high speed tubular stranding machines and double twist bunching machines. In addition, the company has designed a special form of stranding machine that gives something like twice the output of the high speed tubular strander.

The preparation of rubber compounds, and the calendering of rubber into sheets for further processing, is all performed in a self-contained department in which are installed two Banbury rubber mixers each capable of producing 150lb of mixed rubber in ten minutes. The mixed rubber is passed into storage bins from which it is taken either to the calenders, or to straining machines where the rubber is sieved before being used as a tough rubber sheath.

The calendered rubber sheet, which is wound up interleaved with cotton cloth, is removed to a temperature controlled store to normalize and is then removed from the cloth and cut up into the requisite widths of strip. These strips of rubber are applied to the wire on longitudinal insulating machines, each capable of insulating 20 wires at a time. Each machine is capable of applying two or three layers of rubber by compressing the rubber sheet around the wires as they pass through multi-grooved rollers.

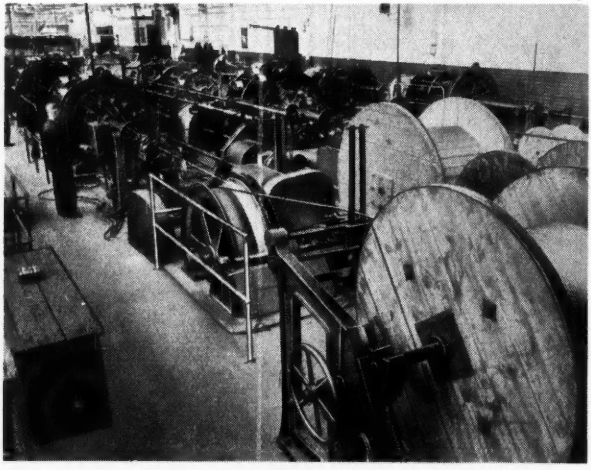
Cables which ultimately have to be braided are commonly covered with a layer of tape before vulcanization. The tape is applied on high speed vertical type machines and the cable subsequently passes into the vulcanizing chambers where a steam pressure of some 45lb/sq in is applied to produce the effect of vulcanization.

The vulcanized cable cores may then pass either to the rubber extruding machines for the application of a tough rubber sheath, to the lead presses for lead covering, or on the other hand they may be laid up into multicores, or braided as single core cables.

The main rubber cable shop is in consequence equipped with a variety of machines to produce the many alternative finishes which can apply to the rubber insulated cable. Of especial interest were the textile braiding machines equipped with a painting device, permitting the braid as applied to be completely impregnated with various colours of protective paint. A more common finish for braided cable is wax compound, and this operation was performed on 4-headed machines with a central wax melting and storage tank.

The new rubber shop extension has been laid out and equipped in particular for the manufacture of large flexible cables such as are used for portable apparatus and, in particular, colliery cables. There are two large rubber extruding machines complete with taping heads and the necessary equipment for automatically winding the cable on to drums or cylinders. A machine is provided for applying metallic screens to flexible cables—such as are used on coal cutting machines. Up to 500 wires in the form of strand can be applied on this machine at one operation.

A large lead extruding machine is employed primarily for the lead covering of heavy rubber cables before vulcanizing.



Steel armouring paper insulated cable

When the rubber is vulcanized the lead strip is removed through a special machine and passed by means of a conveyor back into the lead melting pot. Vulcanization is carried out with the cable wound on to large cylinders which are run horizontally into the vulcanizer.

The shop is equipped with a series of turntables and trolleys for the convenient handling of the large vulcanizer cylinders from one operation to another, thereby reducing handling or crane lifting to a minimum. This shop is equipped with an electrical testing laboratory for carrying out tests on the finished cables. Intermediate tests are performed on spark testing equipment arranged on the shop floor. In addition to the above mentioned special machinery, this new extension is complete with rubber lapping, laying up, and braiding and compounding machines of the conventional type.

The laboratories, which are centrally situated and convenient to all departments, are divided into three sections, one being devoted to purely chemical work, another to physical testing, whilst a third contains pilot plant for the manufacture of rubber mixings and laboratory scale cable manufacture.

Electricity supply is at 6,600 V and is stepped down to 400 V by two 1,000 kVA transformers. These in turn feed a 3-unit cubicle type incoming board, comprising two main breakers and an interconnecting bus section, this main incoming board having a safety interlock system. From this main board the various sections of the works are fed through 26 "Klad A" 600 A circuit breakers, all of which can be separately isolated. The whole of the equipment—transformers, switchgear, instruments and cables—is of Crompton Parkinson make.

Batti-Wallahs' Luncheon

Address by Lord Citrine

THERE was a "full house" at last week's luncheon of the Batti-Wallahs' Society to hear Lord Citrine's address on "The Nationalized Electricity Supply Industry." Lord Citrine prefaced his remarks by saying that he could not claim to have the necessary qualifications to become a member of the Society, but he had many associations with the sea. Members of his family had been sea-faring folk, while in his early days, as a member of the executive of the E.T.U., he was in Liverpool where he did much work in organizing ships' engineers. Now (as chairman of the B.E.A.) he was a ship owner. The Authority had at present thirty-seven ships, and the number would be increased to forty-seven by 1952, with a total tonnage of 123,000. The latest ships built for the B.E.A. had a tonnage of over 4,000 tons each.

While it was intended to expand the Authority's facilities for transporting coal, it was also intended to leave a substantial part of the trade in the hands of private charterers. The B.E.A. ships were modern in construction, with the latest marine electrical equipment, while the galleys were completely electrified. The comfort of the crews had been studied and their quarters compared favourably with those in any ship at sea.

Lord Citrine, in reviewing the organization and progress of the B.E.A., said that their policy had been to carry out the reorganization with the least possible disturbance to the industry, and they had sought to co-operate with all electrical interests with which they came into contact. He spoke of the formidable problems of organization and finance and the human problems which had been the pre-occupation of the Authority in its first years.

The past two and a half years had also been a period of expansion, and this month the Authority was supplying 27 per cent more electricity than at vesting date. He also referred to the problems of providing plant to meet the demand, quoting figures to show the steady rise which had taken place. The progress in this direction depended on Governmental decisions and Lord Citrine said that he was disturbed by the cutting down of the Authority's programme of capital expenditure.

Before the luncheon commenced the company stood in silence in memory of the late Sir Geoffrey Clarke, who had been a member of the Society for many years. The next luncheon will be held on 29th November when the speaker will be Sir Hartley Shawcross.

VIEWS on the NEWS

By REFLECTOR

MR. C. T. Melling is to be congratulated on his frank statement of the electricity supply authorities' case on overhead lines at a conference organized by the C.P.R.E. Remarking that some preservation societies seemed to look upon the Boards as "enemies, vandals and Philistines," he said they forgot that preservation of rural England meant a live rural England, not a dead museum. He pointed out that from the present economic position it did not seem that they would have unlimited resources next year and it might be that they would have to make "savage cuts" in the development programme. This led him to refer, amid laughter, to the fact that the present Chancellor of the Exchequer was recently Minister of Fuel and Power. I wonder what he had in mind!

* * *

In view of all that has been written about competition between Boards and contractors, I was surprised to read the report of an after-dinner speech at Southampton by the president of the E.C.A. describing nationalization as "a red letter day for us." Mr. Wallis was referring to the fact that vesting day marked the end of the hundreds of independent supply authorities. Quite sincerely, he said, they did greet the occasion with a good deal of pleasure, believing that at long last their troubles, due to different regulations, would come to an end. Speaking of the proposed setting up of a National Inspection Council, he expressed the hope that the B.E.A. would assist to the utmost in the successful completion of that scheme.

* * *

Because of the "great difficulty" housewives have in obtaining shillings for prepayment meters, a sub-area manager has suggested that they may prefer the quarterly type and has offered to make the change free of charge. Other disadvantages of slot-meters mentioned are the suddenness with which the supply is cut off and the easily jammed mechanism. Some time ago a proposal in another area to discontinue the use of the more costly prepayment meters was condemned in the local Press on the grounds of hardship, but this more tactful approach, I am sure, deserves a better reception.

* * *

At all bus stops from Aberaman, through Aberdare and up to Trecynon miners and other early morning workers waited in vain for their buses on 23rd October, though the 6.30 hooter had sounded. The reason, it transpired, was that although the Electricity Board's staff had remembered to adjust the street lighting control for "winter time," the clock governing the hooter had been overlooked, and the workers were thus an hour early. An officer of the Board observed that "to err is human," but the workers I understand regarded it less philosophically.

* * *

Most people, I think, would agree that good lighting is a deterrent to crime. I was therefore astonished to read in a Scottish newspaper a suggestion that, on the contrary, it can aid the wrongdoer. The town in question has an installation of sodium lighting and it is contended that the effect is to make recognition difficult. Both the physical features of people and their clothing, it is pointed out, take on strange hues, and if the police are given the description of a man as seen in this light it becomes almost useless in daylight, and in fact might be a danger to innocent citizens. I haven't yet read of a case in which this form of lighting has been put forward as a reason for mistaken identity, but perhaps the best solution would be for the police to hold identification parades with appropriate illumination.

* * *

Reference was made in these notes last week to the masking of the public electric clocks in Sunderland because of inaccuracy in timekeeping caused by power cuts. In last Sunday's *Observer* a correspondent mentioned the subject, pointing out that the authorities have omitted to cover up the slogan "Electricity at Your Service" which, he says, encircles each clock face. I question that "each" if it means "all." And though the time may be out of joint occasionally the slogan remains true.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Fuel and Power has appointed **Mr. H. M. Medland,** of Plymouth, as a part-time member of the South Western Electricity Board in place of the late Eng. Vice-Admiral Sir John Kingcome, K.C.B.

Mr. D. M. Thornton, B.Sc., A.M.I.E.E., whose appointment as engineer to the Southern Sub-Area of the South East Scotland Electricity Board we briefly reported in our last week's issue, was educated at George Heriot's School, Edinburgh, and the University of Edinburgh. From 1923 to 1931 he held appointments in the mains department of the Lothians Electric Power Co., Edinburgh, following which he was district engineer with the Dumfriesshire County Council Electricity Department until 1946 when he became deputy county electrical engineer of Kirkcudbright. In 1948 he was appointed district engineer for Kirkcudbrightshire with the South West Scotland Electricity Board, which position he has now left to take up his new appointment.

Mr. D. M. Thornton

Mr. W. B. Day, B.Sc., has been appointed sales manager of the Yorkshire Switchgear & Engineering Co., Ltd., and will be responsible for all home sales. He will operate from Leeds in co-operation with the London director, Mr. R. Cox. Mr. Day was previously contracts manager and before joining the company in 1945 was with the Asea Electric, Ltd., and earlier with the Brush Electrical Engineering Co., Ltd., as switchgear engineer.

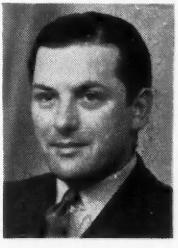
Mr. G. E. Lowe has been promoted to chief engineer of the Yorkshire Switchgear & Engineering Co., following his previous positions as chief draughtsman and chief designer respectively. Before joining the company in 1939 he was with the Magnet Engineering Co., Ltd., and previously was chief draughtsman of the Switchgear Division of the Harland Engineering Co., Ltd.

Mr. W. B. Day

Mr. G. E. Lowe

Mr. A. R. Rumfitt, A.M.I.E.E., has resigned from the B.E.A. Yorkshire Division and has been appointed technical manager of the Yorkshire Switchgear & Engineering Co. Before joining the B.E.A. Mr. Rumfitt was chief testing engineer with Yorkshire Switchgear and obtained his earlier training with the Yorkshire Electric Power Co.

Mr. A. R. Rumfitt



On his retirement from the Pender Chair of Electrical Engineering at University College, London, **Professor R. O. Kapp,** B.Sc.(Eng.), M.I.E.E., has been appointed consultant to Kennedy & Donkin. Prof. Kapp was a member of the firm's staff from 1913 to 1935.

Mr. S. L. Drapier, A.M.I.Mech.E., has been appointed by the British Electricity Authority, South Western Division, to the position of station superintendent of the Newton Abbot generating station. After seventeen years' service with the Worcester Corporation electricity undertaking he was appointed assistant station superintendent at the Newton Abbot generating station in 1948.

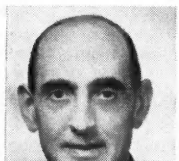
Mr. T. Dooley has been elected to the board of directors of the Hotpoint Appliance Co., Ltd., where he will be particularly concerned with the direction of the manufacturing activities in the factories and his office will be located at Llandudno Junction. Mr. Dooley leaves the Metropolitan-Vickers Electrical Co., Ltd., to take up his new duties immediately. After serving his engineering apprenticeship with the Armstrong Whitworth Co., and being attached to the Admiralty during the 1914-18 war, he joined the M-V organization in 1927 and held positions in the Cooker and Heater and the Steel Products Departments. Later he was in charge of rearmament contracts, and in 1941 he was awarded the M.B.E. in

recognition of his services. In late 1944 Mr. Dooley returned to the Steel Products Department as superintendent and in 1947 was appointed to take charge of fabrication work production at the M-V factory at Stockton-on-Tees.

The Sloan Electrical Co., Ltd., has appointed **Mr. R. N. Morgan-Owen** as sales engineer in the outer West London area. On completion of his education at Wandsworth Technical College he joined the staff of the County of London Electric Supply Co., Ltd., in 1933 as showroom assistant. After six years' war service in the R.A.F.V.R. he rejoined the County of London Co., and upon nationalization was graded development assistant.

Dr. J. S. Forrest, Director of the Research Laboratories of the British Electricity Authority, recently sailed on the *Queen Mary* for New York to visit research organizations and laboratories in the United States and Canada. Dr. Forrest will be absent from this country until the middle of November.

Mr. J. D. Nicholls, Supplies Division, Birmingham, branch manager of Crompton Parkinson, Ltd., has been appointed, from 1st November, manager of the Supplies Section of the Overseas Division. Mr. Nicholls has been with the company since 1934, and served with R.A.F. Training Command from 1941 to 1945. **Mr. C. J. Johnson,** an assistant branch manager at Manchester, is being transferred to London sales control office for special duties, but is temporarily taking charge of Birmingham Supplies Division branch.



Mr. J. D. Nicholls

Mr. C. J. Johnson

Mr. T. Toward, export and advertising manager of Sobell Industries, Ltd., has resigned from the company. In future export advertising will be under the direct control of **Mr. A. B. Singer,** general sales manager.

Mr. W. G. Gray, of Bothwell, Lanarkshire, has been appointed chief administrative officer to the Uganda Electricity Board.

Mr. F. T. Randell has been appointed manager of the Cardiff office of G. & J. Weir, Ltd., and their representative in South Wales and the West of England, in succession to the late Mr. F. C. Williams. Mr. Randell was Mr. Williams' principal assistant for some years.

Mr. S. G. King, A.M.I.E.E., has been appointed London manager of Birlec, Ltd., with offices at 35, Park Street, London, W.1. Mr. King, who has had twenty years' experience of electric furnace work particularly in connection with arc and high frequency melting equipment, has recently returned from a four years' stay in South Africa.

Mr. S. G. King

Mr. S. W. Demain, mechanical maintenance engineer at Earley generating station since 1946, is leaving the country to take up an appointment as station superintendent at Kuwait, Middle East. Previously he was at the Hartlepool works of Richardsons Westgarth & Co., Ltd., subsequently joining the Cornwall Electric Power Co., as mechanical maintenance engineer at Hayle power station.

Mr. J. M. Christie has been appointed deputy manager for Scotland for Sangamo Weston, Ltd.

Mr. G. C. Small, section head of the Public Lighting Department of the East Midlands Electricity Board, was inducted chairman of the Nottingham Centre of the Illuminating Engineering Society at the annual luncheon on 20th October in succession to Mr. R. H. Ellis. Mr. Small is chairman of the panel set up by the Electrical Development Association to prepare a report on the subject of fluorescent street lighting.

The Southern Division, British Electricity Authority, has appointed **Mr. R. G. Henbest,** A.M.I.E.E., power station superintendent at Cowes for the past five years, as assistant station superintendent, Earley generating station. Mr. Henbest was educated at Bridge Boys' School, Harrow, and Acton Technical College. He served an apprenticeship with the General Electric Co., Ltd., and then held appointments with Kodak, Ltd., and the North-Eastern Electric Supply Co., Ltd. Subsequently, he joined the

Mr. R. G. Henbest

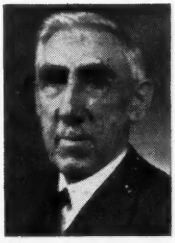
Edmundsons group and acted as charge engineer, maintenance engineer, and station superintendent at Cambridge.

The Long Service Association of the **Micanite & Insulators Co., Ltd.**, held its annual dinner at the Palmerston Restaurant, Bishopsgate, London, on 21st October, when 160 members and guests attended, including three retired members. Six presentations were made this year to members who have recently completed twenty-five years of service.

On 16th October the members of the South Western & South Wales Section of the **Electrical Wholesalers' Federation** entertained the members of the Midland Section, together with their president, Mr. J. M. Hollander, and the director, Mr. A. B. Wildsmith, to luncheon.

OBITUARY

Sir Frank Gill, K.C.M.G., O.B.E., a pioneer in the development of telephony, whose reputation in the field of telecommunications was international, died on 25th October, at Geneva at the age of eighty-four, whilst attending meetings of the International Consultative Committee on Telecommunications (C.C.I.F.).



The late Sir Frank Gill

Sir Frank was born in the Isle of Man and received his technical education at Finsbury Technical College under Professor Ayrton and later under Sir William Barrett at the Royal College of Science, Dublin, Sir Oliver Lodge at Liverpool University, and Sir Ambrose Fleming at University College, London.

He joined the United Telephone Co. in 1882 and two years later went to Ireland with the Telephone Co. of Ireland. In 1890 he was appointed chief electrician for the Liverpool district of the National Telephone Co., subsequently becoming district manager at Blackburn and provincial manager for Ireland in Dublin. He was appointed engineer-in chief of the company in 1902, which position he held until the company was taken over by the Post Office.

For the next seven years he practised as a consulting engineer in partnership with W. W. Cook, carrying out telephone work in various parts of the world. During the 1914-18 war he served with the Ministry of Munitions as assistant, and later controller, of the central stores department, and in 1919 he became associated with the International Western Electric Co. as European chief engineer (later the International Standard Electric Corporation, of which he became vice-president). He was at the time of his death chairman of Standard Telephones & Cables, Ltd., the International Marine Radio Co., Ltd., Standard Telecommunication Laboratories, Ltd., and Creed & Co., Ltd., and a director and vice-president of the International Standard Electric Corporation.

His valuable contributions to the development of telephony were recognized by the Institution of Electrical Engineers which elected him president in 1922 and an honorary member in 1938. He was a member of numerous other professional bodies, a member of the Institution of Civil Engineers, a Fellow of the American Institute of Electrical Engineers, honorary member of the Institute of Royal Engineers, and a member of the Royal Institution, the Société des Ingenieurs Civils de France, and the Société Francaise des Electriciens. He was also twice chairman of the Telephone Development Association. Sir Frank was created K.C.M.G. in 1941 for his services in the development of the telephone industry and of international telephony.

Mr. T. P. Wilmshurst.—The death occurred on 27th October at the age of eighty-one, of Mr. Thomas Percival Wilmshurst M.B.E., a former Electricity Commissioner. Mr. Wilmshurst was appointed a Commissioner in November, 1926. He was formerly electrical and tramways engineer to the Derby Corporation and was also chairman of the Engineering Consultative Committee of the East Midlands Electricity Advisory Board. Mr. Wilmshurst was a member of the Institutions of Civil and Electrical Engineers.

Mr. H. M. Harris, chairman of T.M.C.-Harwell (Sales), Ltd., died on 23rd October. Mr. Harris, who retired from the position of managing director of the company at the end of 1949, had been in the industry for over fifty years. After serving in the 1914-18 war he formed Harwell, Ltd., to distribute various electrical goods, and when that company's business was taken over by the Telephone Manufacturing Co., Ltd., in 1933 to distribute "Temco" electrical accessories and synchronous clocks, he became managing director. On his retirement as managing director of T.M.C.-Harwell (Sales), Ltd., Mr. Harris was elected chairman of the company.

Mr. B. G. Donne.—The death occurred on 19th October of Mr. Brian G. Donne, joint managing director of the Automatic Coil Winder & Electrical Equipment Co., Ltd.

Mr. A. Gowans Whyte.—A meeting to the memory of Mr. Adam Gowans Whyte, who died recently, is to be held at the Conway Hall, Red Lion Square, W.C.1, on 16th November (3 p.m.). Mr. Whyte was a former editor of *Electrical Industries* and was for some time on the staff of the British Electrical Development Association.

Linear Accelerators

X-Rays for Clinical Use

THE rapid progress in engineering science in the last decade is well illustrated by the new high voltage X-ray equipments, known as linear accelerators. One such machine for giving 10 MeV X-rays has been designed and constructed by the Metropolitan-Vickers Electrical Co., Ltd., while three basically similar machines designed to give 4 MeV X-rays have just been ordered from the same company. These use components and techniques evolved during the war primarily for use in radar equipment.

The driving force of the 10 MeV linear accelerator is a high power 10 cm radio-wave generator. Waves from this generator are caused to pass down the inside of a long copper tube about 4in in diameter and containing a large number of accurately made copper diaphragms, each of which has a central aperture. The velocity of the radio waves at any point along the tube is determined by the tube and aperture diameters.

A beam of electrons is injected at one end of the tube and passes along it through the holes in the diaphragms, "riding" on the radio wave in a way roughly analogous to the motion of a surf rider.

The dimensions of the diaphragms are such that the radio wave speeds up as it passes along the tube. Thus the electrons are caused to speed up also until they reach about 0·998 times the velocity of light. At this speed they are allowed to strike a water-cooled gold target with the result that it emits an intense beam of X-rays with a very high power of penetration.

2,000 kW Output

Some idea of the power of the machine is given by the fact that, with the magnetron valves used for the generation of these waves, pulse output powers of the order of 2,000 kW can be obtained.

In order that the electrons may pass down the accelerating tube without being scattered, it is necessary to evacuate all gas from the system. This is accomplished by high-vacuum pumps, the development of which is based on the original work of Dr. C. R. Burch, F.R.S., in the Metropolitan-Vickers Research Laboratories.

For clinical use, it is necessary to direct the X-ray beam at the treatment area, to be able to vary the beam dimensions, and to regulate the dose rate of the X-rays administered to a patient. These controls are all exercised by means of a rotating X-ray head, necessarily of complicated design, which is fitted to the end of the acceleration tube. This X-ray head itself weighs almost half a ton. An elaborate control system for the whole equipment is provided and is centralized in a radiographer's control desk which is, however, as simple to use as the control desk of an ordinary 250 kV X-ray therapy set. A feature is that the noise level in the treatment room will be low.

First of its Type

This 10 MeV machine is the first high-energy linear accelerator in the world to be built for therapy purposes. It is to be installed in a special building at the Hammersmith Hospital, London. The expected X-ray output is at least 150 röntgens/min at 1 metre from the target.

The development of such accelerators has been made possible by original work carried out in the first place by the linear accelerator team of the Atomic Energy Research Establishment. In later developments Metrovick have been in close association with the radiotherapeutic research unit of the Medical Research Council, for whom the machine described above has been constructed.

Investigations made after the order for this machine was given showed that 4 MeV machines could be constructed with some saving in size and relatively small decrease in therapeutic efficiency. Five 4 MeV linear accelerators are therefore being ordered by the Ministry of Health for clinical use in selected hospitals in this country, and three of them will be made by Metropolitan-Vickers. These machines will have a new form of trunnion mounting to facilitate treatment of the patient.

It is expected that for clinical use the 4 MeV machine will be standardized and made available on a commercial basis by Metropolitan-Vickers through its associated company, Newton Victor, Ltd.

Western European Power

Future Development and System Policy

By A. M. TSIRIMOKOS,* Ph.D., A.M.I.E.E.

THIS article expresses the personal views of the author and must not be regarded as an official pronouncement.

The question of a future European power grid has been the subject of very controversial views. Arguments based on technical and economic calculations for or against the need for an integrating super-grid are all based on certain implied assumptions. The arguments vary according to the personal appreciation of the future of the political and economic integration of Europe. They imply the acceptance of a definite attitude towards the persistence of the present implication of the principle of national sovereignty. The structural development of the European economy in general and the electrical economy in particular is dependent for the future on a more elastic interpretation of this principle.

General Considerations

By bringing into evidence this subjective factor, which exists in all theses dealing with the interconnecting grid, we are aiming at making quite clear the need for a very exact definition of the standpoint from which all studies must proceed. In this particular attempt, the views expressed are based on the following two assumptions :

First, progressive abolition of all the effects of the principle of national sovereignty which hinder the free circulation of energy between countries and, secondly, continued improvement of the process of economic integration of the European member countries of the Organisation for European Economic Co-operation (O.E.E.C.) which should help the abandonment of a policy of national autarchy in the production of electrical energy. It will thus be possible, as regards electricity, to obtain a high concentration of production along the lines of greatest efficiency. Countries producing cheap energy will continue their power development policies, while those which can only generate electricity at comparatively high cost will become importers.

* O.E.E.C., Paris, Principal Administrative Officer, Electricity Section.

The need for a basic policy, which will provide the guiding principles for the study of the future development of the electricity supply industry in Western Europe, is now more than ever evident.

Proposed Development

The main considerations in elaborating such a policy can be summarized on the following broad lines :—

(1) The energy balance to be sought in planning the future power programme should be based on considerations of an intra-European instead of a national character. This means that equality between supply and demand has to be on a European basis, "globally" and not locally within each individual country. The mutual contribution in this overall balance of hydraulic and thermal power, which is a decisive factor for such large-scale design, has to be planned on a regional level so as to ensure the most economical operation of the system.

(2) For the selection of projects, from the point of view of resources and their utilization, the whole must be studied without regard for frontiers. Then those projects needed for using such resources as will be required to meet the increasing demand will be selected in accordance with the following criteria : (*a*) thermal component, stations consuming lignite and low-grade fuel of no marketable value ; (*b*) hydraulic component, run-of-river stations and others of comparatively low cost.

Later Projects

Subsequently, when these two classes of new power projects have been exhausted, expensive hydro-projects and steam power stations burning marketable coal will have to be considered. A rational policy along these lines could then proceed to study power projects, thermal and hydro, for peak load demand. The time and extent of their necessity are determinable by estimating the future energy surpluses, taking into account

the overall situation from the point of view of interconnecting operational facilities.

The net effect on the total power availability of commissioning the new plant belonging to the above two classes will be reflected by the place which it will occupy in the overall load duration curve. The more economical stations will be placed at the bottom of the load curve, whereas the costly generating stations operating as peak energy suppliers will progressively move towards the top.

Main Power Sources

Assuming such a use of the existing and potential power resources, the question arises of an intense regional concentration of production with all its implications. During the next 10–20 years the two main sources to be tapped for the larger part of the energy required will be those of Germany (brown coal) and those of the Alpine area (and the Pyrenees). As integration of the power system proceeds the British thermal system and the Scandinavian hydro-system may be invited to operate jointly with the Continental interconnected systems, provided that such a step is proved to be economically sound. It is during and at the end of the decade 1960–70, when the hydro resources of the Alps have been fully exploited, that the use of nuclear energy for power production will become the object of comparative studies of decisive character for its future development.

The natural consequence of the regional production policy outlined above will be the need for providing means for transmitting the generated energy to the big centres of consumption. At this point, the question of the voltage and the structure of the European grid has to be considered.

The determining factors deciding the voltage, the directions and lengths of transmission lines, and the number of lines needed for the interconnecting network depend on the (absolute) increase in consumption and the (relative) geographical distribution patterns of the centres of production and consumption. From study of these two factors the amount of energy to be moved over Europe could be estimated. Then the utility and economic soundness of a 400 kV power grid could be ascertained. One more factor must be taken into account: it concerns the building, or reinforcement, of those links which will provide the flexibility required in order to transmit energy quickly from one place to another.

The main factors which must be taken into account in planning the development of the European interconnection system can be summarized as follows :—

(*a*) Comparison of transport costs: a number of studies, especially that of the secretariat of the Electric Power Committee of E.C.E.* have established that, at the present rates for coal transport for distances exceeding 200 km, transmission of the normal load at 380 kV (the load varying between 200 and 600 MW according to the distance) is economically recommendable.

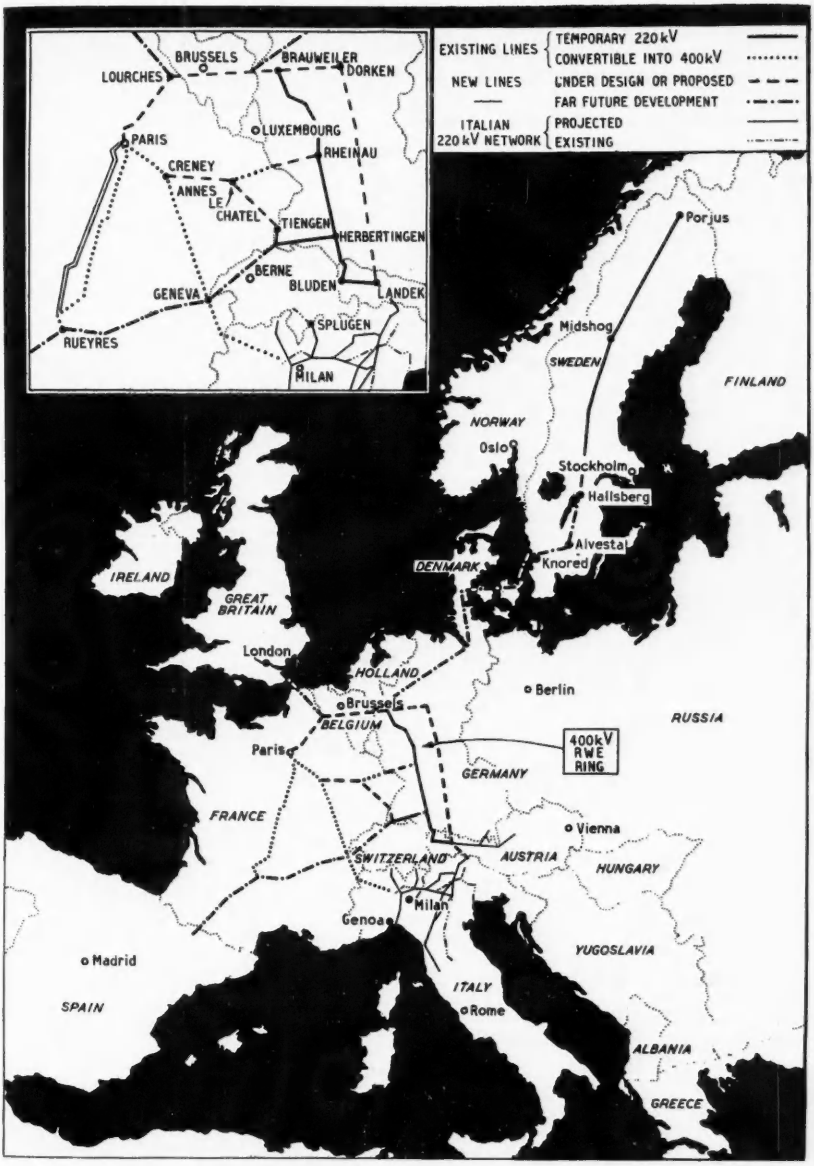
(*b*) Compensation by interconnection: by employing an integrating grid the time-displacement of peak periods in the various European national power systems could be exploited for load compensation, which would lead to a saving of some of the extra capacity needed to be kept in reserve. The study by Cahen and Pelissier presented at the 1949 "Unipede" Congress† (paper IV, 3) shows that under certain conditions attainable in Europe the cost of constructing and operating a European 380 or 400 kV superimposed grid could be partially, or perhaps entirely, offset by the saving in new investment for reserve (peak period) plant.

(*c*) Co-ordinated operational regime: in an overall system of interconnected countries, as distinct from national systems, the ratio between hydraulic and thermal energy produced regionally is a determining factor for safe operation during years of low "hydraulicity." The interconnecting network will serve to transfer supplies of thermal and hydro energy in space and time, so as to ensure the continuous equilibrium of supply and demand.

Two Trends

At this point we meet the two trends which predominate in the future development of European power policy. The first, known as the principle of "transfer by displacement" of power between national systems, is of an empirical nature. It favours the trial and error method of interconnection and adheres to the principle of marginal links between networks. The power exchanges thus effected will be in quantities of secondary importance when compared with the total supply of the nation concerned.

*United Nations Economic Commission for Europe.
†Union Internationale des Producteurs et Distributeurs d'Energie Electrique.



First approach to prospective elemental intra-European high voltage grid network

The second trend favours long-term planning and considers that the organic development of electricity supply in Europe has now reached a stage at which the national conception of more or less autarchic units must give way to an international conception of an integrated European power system.

It is clear that both these theses affecting the future include an appreciation of the possible limitations to be imposed upon the principle of national autonomy. That is why this review opened by stressing the influence of this factor on all the views concerning the future rational development of the European electricity economy.

European Grid

The map is a first approach to future and far-future development. It must be clearly stated that the lines drawn are not the result of any thorough investigation in which both technical and economic data have been used and carefully weighed. They merely point towards studies which should be undertaken in order to find out whether construction of these lines should be recommended. In selecting the elements for a prospective intra-European grid the following has to be taken into account: weaknesses of the existing links between national power systems are their inadequacy for a future envisaging intensive and extensive power exchanges. Thus (i) the Italian 220 kV network (existing and planned) is linked to the French and Austro-German network, which is at present 220 kV, but which will eventually operate at 400 kV; (ii) the area between Aachen and the Ruhr is linked with the main French network through new 400 kV lines.

New lines have been designed to combine some evident normal and emergency operational advantages, thus paving the way for the new 400 kV integrating grid. They also allow for the necessity of linking, through France, the resources of the Pyrenees and of the Alps with the industrial area of the north. The stage at which the 220 kV network shown on the map would be converted to 400 kV is also a question to be studied; it involves the estimation of the additional amount of power which could be carried owing to the higher voltage used. The increased carrying capacity, viewed in the light of normal and emergency transfers of energy, will be the determining factor in deciding how soon the conversion has to take place.

In conclusion, this article aims at placing the problem of the evolution of the European interconnection network within the framework of the electrical economy in general. The Western European power system has to be studied from a completely new standpoint, seeking the optimum production and operational economy in a regime of rational utilization of potential power resources. The integration of electricity supply economy is envisaged under the following assumptions:—

(i) The transition from the present stage of frontier interconnection of national networks to a single intra-European power system with centralized and co-ordinated operation (the international Power Pool which has been elaborated by the Electricity Committee of the O.E.E.C. could be considered as a first step in this direction).

(ii) The possibility of evolving from a situation in which the balance between supply and demand through the mutual contribution of thermal and hydraulic energy is more or less limited at a national level, to a new regime under which the balance would be assured on an international level through an intra-European network linking together the regions of production of these two components and the areas of dense load.

European electrical economy will thus be characterized by a balance of power which will be both (*a*) overall, owing to the free circulation of power, varying according to the seasons and the hours of the day, and (*b*) local, within each country, in the form of imports and exports of energy assured through power exchanges. The question of the *voltage level* is a technical one which can be answered after movements (amounts and directions) of power between producing and consuming areas have been carefully fixed. Many factors point towards operating at 400 kV in view of the increased carrying capacity and flexibility which would follow its adoption.

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Electricity and Amenities

Board Chairman's Address to C.P.R.E.

THE position of Electricity Boards in relation to rural electrification, particularly the erection of overhead lines, was explained by Mr. C. T. Melling, chairman of the Eastern Board, at a national conference of the Council for the Preservation of Rural England held at Tunbridge Wells. Introducing the subject, Mr. Melling said that he shared with his colleagues the deep conviction that electrification was one of the most important solutions of our economic problems. On the other hand, as one who had walked and scrambled in the Lake District, North Wales, the Peak District and various other localities, he felt a strong sympathy with the Council's desire to retain all that was beautiful in our rural life.

There were many statutory requirements with which electricity suppliers had to comply before an overhead line could be erected. The best safeguard, however, was that the Boards' engineers had a sense of public responsibility which caused them to examine the problem of overhead lines not only from the technical and economic aspects, but also from other viewpoints. On the question of cost, he showed that if underground l.v. cables were used the £100 million estimated cost of bringing electricity to all villages and hamlets and the majority of farms in England and Wales would be raised to £150 million, while if underground cables were used exclusively the figure would go up to £250 million, apart from the cost of converting existing overhead lines. Another point was that overhead systems could be augmented and extended more easily. Mention had been made in the Scott Report of undereave wiring. This method could be employed with reasonable economy where houses were built in terraces, but where the elevations differed materially the system involved catenary suspension across the gaps, which would often be unsightly as well as unsafe.

Electricity itself was an amenity desired by all rural dwellers. Mr. Melling contended that overhead lines were not fundamentally ugly. If well proportioned, designed to fit the purpose and sited unobtrusively they were in many cases an appropriate symbol of an awakening countryside. Objections were frequently not to the lines themselves but to the change they introduced into the scene.

Electricity Boards were willing to meet the incidental extra costs entailed in making the lines conform with the natural terrain and providing short lengths of underground cable near ancient monuments. In the case of the National Parks, there was no reason why overhead lines should not be used in many parts of these areas. Where cables were required it would be wrong to charge the extra cost to the local inhabitants and other consumers in the price of electricity. If as a nation we decided that any parts of the Parks should be free from mechanical construction the cost should be met from national resources.

Western European Power

(continued from page 688)

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Scottish Transmission Line

A £452,000 contract by the North of Scotland Hydro-Electric Board for the erection of a 132 kV transmission line between Aberdeen and Boat of Garten, on the River Spey, has been awarded to Riley & Neate, of Winchester.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Astrophysics

BRITISH electrical engineers have a special reason to be interested in your leading article in the issue of 20th October, since one of the pioneers in the new views of astrophysical phenomena was Mr. C. E. R. Bruce, of this Association. Indeed he has gone further than most astrophysicists in suggesting that practically all astrophysical phenomena derive from electrical discharges, and that it is these discharges which have largely determined the course of universal evolution, from nebulæ to stars, stars to planets, and planets to satellites.

In recent contributions to *Nature* and the *Observatory* Mr. Bruce has suggested that many of the effects observed in the spectra of solar flares, stars and novæ, which are usually attributed to Doppler effect due to movement of the radiating atoms in the line of sight, may in fact be the result of Zeeman effect caused by the magnetic fields in and about the discharges in which the emission arises.

In the present connection it is of interest to record that it was Prof. Chapman's description of solar prominence in his Kelvin Lecture to the Institution of Electrical Engineers in May, 1941, which initiated these studies. Mr. Bruce was then investigating the characteristics of lightning and concluded that velocities of a million km/hr could only be explained in terms of electrical discharges. Astrophysicists are now tending to accept this view, so that his work may have "proved an inspiration to later workers," as one astronomer described it.

Leatherhead, Surrey. D. V. ONSLOW, *Information Officer*, Electrical Research Association.

Motor Design Courses

MR. E. O. Muller's letter was of particular interest to me, as some years ago I found myself in a similar position. A search of the libraries revealed very little information at first but, once having located a few articles in various English and foreign journals, I soon managed to accumulate considerable literature on almost every type of f.h.p. motor. This literature gives much specialized practical and theoretical information, the basic theories of most types being adequately dealt with in design books.

While it may appear rather tedious collecting such information and a design course would at first sight seem an easy short cut, it is doubtful if such a course could be run economically and satisfy the diverse requirements of those interested. Furthermore, any lecturer actively engaged in industry would, for obvious reasons, be precluded from divulging too many of the design and manufacturing methods of his company. Considering the many different types and the still controversial approach to the theory of some of them, as well as the need for practical demonstrations necessary to make such a course of real practical value, it is fairly obvious that only a university, technical college, or research organization could do justice to the complex subject of fractional horse-power motor design.

There is no doubt that plenty of scope still exists for the exchange of information on many of the more general aspects of f.h.p. motor design and construction, particularly with a view to the standardization of many components. Such an exchange could be carried out on a national basis, thus producing the maximum benefit to the industry as a whole, particularly at a time when maximum efficiency and economy in the use of raw materials is again becoming of paramount importance.

It is only from such discussions, a study of current practice and actual practical experience, that any specialized design work can be mastered.

*London, N.*11. E. H. WERNINCK.

Industrial Supervisors

AT a meeting held at the Royal Technical College, Glasgow, on 25th October, Scottish members of the Institute of Industrial Supervisors decided to form a Glasgow and West of Scotland Section. This Section, the first to be started in Scotland, is the fifteenth to be formed since the Institute was founded in the Midlands in November, 1948. Mr. A. J. Lenox was elected chairman and Mr. A. O. Slater, 18, Brisbane Street, Glasgow, hon. secretary.

Electrical Research

Is Committee Control Restrictive?

THE inaugural address of Mr. S. E. Goodall (chief engineer, W. T. Henley's Telegraph Works Co., Ltd.) to the Supply Section of the Institution of Electrical Engineers was a critical examination of the manner in which large electrical industrial organizations investigated new ideas and the way in which they were subsequently developed into processes and products. His object was to seek for means of rectifying the deficiencies of our industry in translating the results of research into active production.

The patterns of existing organizations were first briefly outlined, emphasizing the need for adequate workshop facilities capable of very high precision work within the laboratories. Administratively, the company with which Mr. Goodall is associated had divided its laboratories into groups corresponding to the main phases of activity. Superimposed thereon was a team system with leaders, whereby each individual problem could be assessed and investigated by the most appropriate combination of knowledge and skill.

Co-operation with Universities

It was a mistake to load research laboratories with too much routine testing work, which should normally be undertaken by the factory inspection section; but in some cases complete segregation would involve unnecessary duplication of expensive equipment. A limited amount of academic investigation should be permitted, to encourage the free interchange of ideas between industry and the universities. The importance of such liaison could not be overstressed. One of the best methods of ensuring its effectiveness was for an industrial concern to establish with the appropriate faculties in the local university some definite arrangement for mutual help in a subject of common interest.

Mr. Goodall next pleaded for very careful selection of programmes of research. There had been instances of work done by, say, the E.R.A. being duplicated in more than one industrial laboratory at the same time, purely because the individual concerned felt that a quicker and better solution was likely to be found in an industrial laboratory. The reason was the burden of over-elaborate committee systems. It would be wise to entrust more of the detailed work to the investigator himself, so freeing him from unnecessary restraint, which caused delay, imposed by an over-elaborate system of criticism and control.

American Practice

In order that the technical side of an industrial organization should be free to pursue lines of investigation of scientific interest and potential value, it was imperative that there should not be unnecessary commercial restraint. The only practical control that could be imposed was by voting a lump sum of money yearly for such work, but working to a budget in that way could not cater for major developments. It was in that respect that there seemed to be a distinct difference in outlook between U.K. and U.S. industrialists. Leading American industrialists, together with a very large percentage of their commercial staffs, had, as part of their normal education, considerably more technological and scientific training than did British business people.

Average delays in translating the results of research into production effort in the two countries could not be fairly compared, but the time taken to produce the finished article did often appear to be too long. The reason was quite simply that in most companies it was no one's particular full-time job to shorten the transition period and, in addition, it took far too long to persuade the financial side of the organization that the transition would in fact be worth while.

For some types of products the development work could be carried to the stage at which prototype manufacture on a small scale was begun in the research section. An alternative was an entirely separate department, properly equipped with tools and plant, to take over a prototype and turn it into an article ready for works production. A third method was for each branch of production to carry its own development staff. Either the first or second method was to be preferred; neither would be cheap, but adoption of some such method would bring its reward.

Dairy Show

Prominence of Ice-Cream Equipment

WITH every year that passes equipment for the use of the ice-cream industry occupies an increasing share of the annual Dairy Show held by the British Dairy Farmers' Association at Olympia, London. Not so many years ago ice-cream apparatus was mainly concentrated in a comparatively few stands in the National Hall. Now with the ever increasing use of pasteurizers, homogenizers, ageing vats, freezers, hardening cabinets, chocolate melting kettles and enrobers, brickette cutters, wrappers and conservators, not only was this hall largely allocated to this branch of the industry but a large quantity of ice-cream equipment was to be found in the Grand Hall also.

Apart from this development another striking feature of this year's exhibition was the comparatively small amount of equipment intended for the larger dairies. Instead, many manufacturers concentrated on showing equipment for the smaller milk producers.

Model Dairy

This tendency was typified by an extremely practical exhibit by the British Electrical Development Association—a fully-equipped model all-electric dairy, designed specially to meet the requirements of the smaller dairy farmer. The display took the form of a wholesale-producer dairy building incorporating a representation of an electric milking parlour of four stalls utilizing positive bucket plant and suitable for farmers having herds of from 15 to 30 cows. The electrical equipment included a chilled water type milk cooler, and a block storage type sterilizing chest, which also supplied the steam for a churn stool and an auto-wash unit. Provision for water heating was by one of the new 20 gall farm type electric water heaters, which are free of purchase tax.

The plentiful supply of hot water on the farm was further exemplified by a dairy water heater among the General Electric Co.'s exhibit, which also comprised sterilizing equipment, including directly heated and thermal storage chests; a storage steam raiser and a block steam raiser/water heater; crop drying equipment, including "Aerofoil" fans and air duct air heaters for drying grain in sacks or ventilated bins; apparatus for barn hay drying; a double sack electric hoist and a pig farrowing heater.

Three new products shown by J. W. Woolley & Co., Ltd., were a 48 cu ft "Electrobloc" sterilizer giving hot water and steam and dealing with a chest full of tinned utensils in 10 minutes; a mobile potato steamer in 1 cwt and 5 cwt sizes for use in conjunction with an "Electrobloc" unit; and the "Bailtrail," a mobile version of an "Electrobloc" unit intended for sterilizing bail milking plants which, like the dairyman's electric vehicle, is plugged in for automatic recharging at the end of its round.

Electric Vehicles

Reference to electric vehicles leads us to mention the gratifyingly large number on view. We noticed at least nine different makes, including several with special bodies for use of the ice-cream trade. The "Helecs Intruder" model with compensated differential link controller was shown by Hindle Smart & Co., both in chassis form and with a milk dray canopy type body. Alternative versions of the Brush "Pony" vehicle had open dairy, closed cab and food and drink kiosk bodies.

To revert to farm equipment, while there was evidence of the growing use of milking parlours, the demand for portable milking equipment appears to be growing. One especially small unit, the H.E.M. "Midget," is not much bigger than a typewriter and costs under £50. Keeping the floor of the cow houses clean is greatly facilitated by the use of the "Darbek" manure conveyor made by the Rustproof Metal Window Co.

Satisfactory pasteurizing of milk on a small scale has till now been largely dependent on the human element. The "Desco" automatic temperature controller removes the guesswork from the operation and is applicable to both water jacketed and steam heated batch pasteurizers without other modifications than the insertion of electrically operated valves in the steam line and simple electrical interconnection with the controller. A new 25 gall electrically operated milk

cooler and pasteurizer was accompanied on the Henwood Productions stand by the prototype of a 10 gall combined ice-cream cooler and ageing vat. Alfa Laval had a new range of cream separators.

A most comprehensive display of refrigeration equipment was on view and covers milk cooling plant on the direct expansion and brine systems, domestic and commercial cabinets, all sizes of cold rooms, air- and water-cooled condensing units, freezers, conservators and frozen food cabinets. Though many examples were to be seen, the last-mentioned item was perhaps not quite so conspicuous as at last year's show. One interesting unit, however, was the Frigicold " Freezemaster " cabinet designed for use on farms to quick-freeze food at –30 deg F.

A churn immersion cooler with a capacity of four churns, demonstrated by the Pressed Steel Co., Ltd., can be used for both milk cooling and storage, while one of the working exhibits of the International Refrigeration Co., Ltd., was a 200 gall/hr. direct expansion surface type milk cooler. The main exhibit of the S.B. Engineering Co., Ltd., was a continuous ice-cream hardening tunnel complete with conveyor, coils, surge drum, liquid ammonia pump and interconnecting piping. Peerless Refrigeration, Ltd., showed a new coin-operated ice-cold drink dispenser.

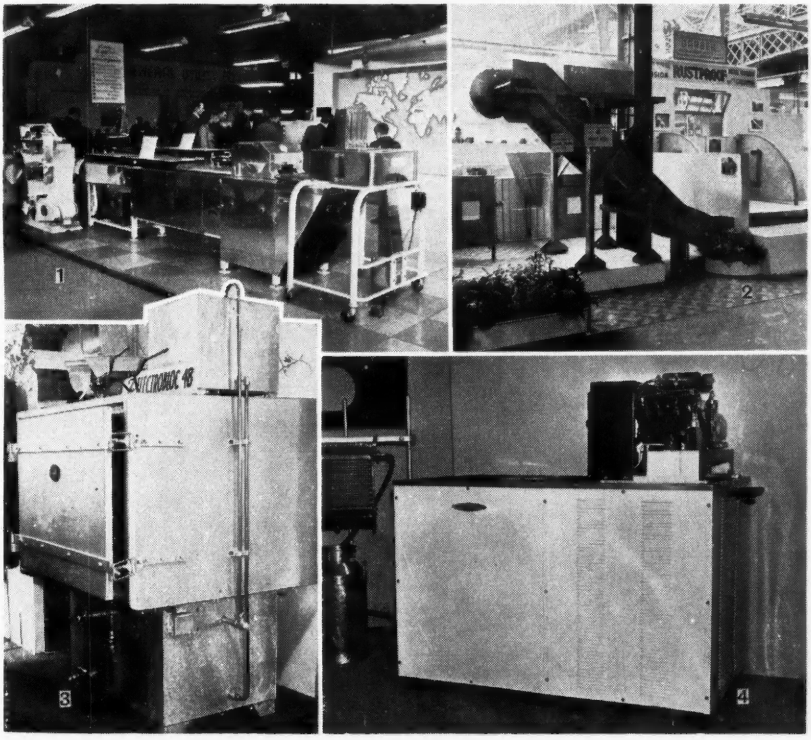
All outputs are catered for by a complete range of ice-cream cutting, dipping and wrapping machines demonstrated by Rose Brothers (Gainsborough), Ltd., three new machines being included in the display. A chocolate enrober capable of dealing with 7,000 brickettes an hour attracted a good deal of interest on the stand of Walter Denis Contacts Co., Ltd., while a special type of

(1) " Walden " 7,000 per hour chocolate enrober

(2) Keeping the cow house clean is greatly assisted by the "Darbek" manure conveyor

(3) Woolley 48 cu ft " Electrobloc " unit

(4) Peerless milk cooler



"Walden" enrober (1,800 per hour) shown by Nathan's Sales, Ltd., is designed for use with slow drying chocolate without sacrificing output. Special attention was drawn to a "Prestcold" soft ice-cream machine. An ice-cream sandwich dispenser was prominently displayed by the Lightfoot Refrigeration Co., Ltd.

In the poultry section incubators shown were almost without exception electrically operated and heated and ranged in size from units holding a few dozen eggs to several thousands. Some of the brooders incorporated infra-red heaters, though the more conventional wire heating elements were generally favoured. The "cafeteria" type feeders in which the hens are fed, watered and have their droppings taken away automatically appear to be growing in popularity. Auto-Feed (Canterbury), Ltd., showed a smaller version of an eight tiered triple battery accommodating nearly 5,000 birds which has just been installed near Ashford, Kent.

Parliamentary News

BY OUR SPECIAL REPORTER

WHEN the continuance of certain Defence Regulations was being discussed in the House of Commons last week, Mr. Manningham-Buller moved to omit Regulation 16, which gives power to the Minister of Fuel and Power, if he considers it necessary for the purpose of working open-cast coal or constructing or extending an electricity generating station, to order the stopping up, or diversion, of the highway. He said that when the matter was last discussed he was given an assurance that where any permanent stopping up was contemplated it would be done by Act of Parliament. The stopping up of a highway for an electricity generating station was not likely to be of a temporary character, nor was it likely to be something which had to be done in a great hurry.

Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power, said that this regulation was being used only in the case of Stuart Street power station, Manchester. He hoped that, on the understanding that they would not use this regulation in another case in relation to power stations, and only wanted to retain it in connection with open-cast mining, the motion would be withdrawn.

The motion was accordingly withdrawn.

Socialized Industries

Mr. Herbert Morrison, Lord President of the Council, moved a motion noting the steps taken to give effect to the responsibility to the community (including consumers and workpeople) of the socialized industries, and welcoming any further measures to increase their public accountability, consistent with the duty of the Boards to manage the industries with maximum efficiency in the public interest. While he deprecated any inquiry by a Select Committee into the work of these industries, he suggested that there might be periodical reviews, say once in every seven years.

Mr. R. A. Butler, for the Conservatives, said that they considered the whole of the activities of the public Boards should be submitted to the Monopolies Commission just as much as private industry. The competition which took place, particularly in the electricity industry, where a Board subsidized by private funds undercut a small proprietor, was extremely unfair. There was also a danger in the electricity industry that standardization of electricity plant through a monopoly in buying might drive other firms manufacturing a range of electrical goods out of the market.

Lord John Hope raised the question of the disposal of the general reserve funds of local authorities in S.E. Scotland. This matter was causing a great deal of dissatisfaction. The Board's claim to retain possession of the funds was turned down chiefly on the grounds that the Electricity Act meant nationalization and not regionalization. The answer to that was that distribution in this industry had been decentralized to 14 Area Boards. It could never have been the intention of the Electricity Act that savings accumulated by good management in any particular area should, after vesting day, be dissipated.

Mr. Noel-Baker, the Minister of Fuel and Power, said he regretted he was not able to answer Lord John Hope on this particular point, but he hoped to do so another day. Replying to criticisms of increased divisional and headquarters staffs, he said that the increase with regard to the electricity industry was largely on paper. Fifteen thousand people who were not counted in before vesting day, were counted in afterwards. They decided on a 44-hour week, and that meant 7,000 more. Electricity was a very rapidly expanding industry and, of course, the number of the

personnel increased, but the proportion was smaller than the rate of expansion. Efficiency was increasing every year. It was the definite policy of the Government that there should be an inquiry into the work of these socialized industries every seven years.

The motion was agreed to.

Television Transmission by Amateurs

Mr. Charles I. Orr-Ewing asked the Postmaster-General why he would not permit amateurs in this country to transmit television in the internationally-agreed amateur bands, as was at present being done in the United States and Holland.

Mr. Ness Edwards said that this question had been reviewed and he was glad to announce that arrangements were being made to license the transmission by amateurs of television signals in the bands 2,300–2,450, 5,650–5,850 and 10,000–10,500 Mc/s.

Power Cuts

Mr. Granville asked the Minister of Fuel and Power if he was aware that the continued cuts in the supply of power in the mornings, lasting as long as two hours, were creating a standstill in industry at 8 a.m. and were seriously hindering production and export.

Mr. Noel-Baker said he was aware that recent load-shedding had caused some loss of industrial production. It was due to the unusually cold weather which occurred at a time when a fairly large proportion of the generating plant was still being overhauled. As it was impossible to segregate industrial supplies entirely, some interruption of industry was inevitable. From information that he received regularly from the British Electricity Authority it was clear that the rate of commissioning of new generating plant was increasing as the months went by and was keeping pace with the capacity of the manufacturers and civil engineers to install and erect new stations. All possible steps were being taken to ensure that this rate of increase was not only maintained but improved.

Radar to the Moon

Mr. Bossom asked the Lord President of the Council how much public money was being spent upon the experiments being arranged to send radar messages to the moon from the Festival of Britain.

Mr. Herbert Morrison said that the equipment which would enable visitors at the South Bank Exhibition to see the reflection of radar signals from the moon would cost £25,000. This display would certainly be attractive and informative to the general public, besides which its unique equipment would make possible the next stage in the practical development of radar astronomy. Britain at present led the world in this important subject of research—indeed, the South Bank equipment itself would be used during the exhibition for serious research purposes as well as for interesting the public. After the closing of the exhibition it would be devoted wholly to scientific use.

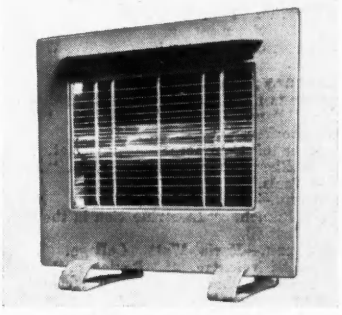
Accident-proof Fire

DURING the past few months a great deal has been said about the dangers of unguarded fires and, most unjustly, about the particular risks attaching to electric fires. There are many advocates of guarding but they differ in their ideas as to the methods to be employed.

Ferranti, Ltd., Hollinwood, Lancs, have stepped into the arena with a design of fire which should satisfy most critics as it embodies practically all the safeguards which have been suggested. Basically the "Safera" is the Ferranti parabolic reflector fire with a 1,250 W element. It has a rather large metal frame (about 21in wide by 19in high) stove-enamelled in "Ambronze" colour. The element has a specially designed shield which makes it impossible to touch it purposely or accidentally. Ceramic protection is employed for the element contact arms.

The front enclosure is an anodized aluminium alloy grille with graduated horizontal slats and it is possible, with the element switched on, to rest the hand upon this guard without discomfort. Two flexible metal feet absorb mechanical shock. By means of a mercury cut out connected in the circuit the element is switched out if the fire is tilted forward more than 15 deg from the vertical and therefore if it is pushed over.

The fire weighs 12lb and costs £8, plus £5 17s purchase tax in the United Kingdom. There is also a panel model at the same price with simple fixing arrangements.



The Ferranti "Safera" fire

NEXT WEEK'S EVENTS

Monday, 6th November

BIRMINGHAM.—James Watt Institute, 6 p.m. I.E.E. South Midland Centre. "Science in Relation to the Electrical Industry, with special reference to Developments in the last Fifty Years," by Dr. W. Wilson.

ILFORD.—Angel Hotel, 8 p.m. A.S.E.E. North East London Branch. "Electrical Control Gear for Resistance Welding," by H. E. J. Butler.

IPSWICH.—Great White Horse Hotel, 6.30 p.m. I.E.E. District Meeting. "A Review of Research in Electricity Supply," by C. W. Marshall.

ISLINGTON.—Town Hall Theatre, 7.15 p.m. E.P.E.A. London Technical Group. Film show, introduced by the Earl of Verulam.

LIVERPOOL.—Royal Institution, Colquitt Street, 6.30 p.m. I.E.E. Mersey & North Wales Centre. "Crystal Diodes," by R. W. Douglas and Dr. E. G. James. "Crystal Triodes," by T. R. Scott.

LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. "The Anglo-Continental Telephone Service," by J. Rhodes.

MAIDSTONE.—New Inn, Sandling Road, 7.30 p.m. I.E.E. District Meeting. "The Measurement of Light and Colour," by G. T. Winch.

NEWCASTLE-ON-TYNE.—Literary and Philosophical Society, Westgate Road, 6 p.m. I.E.E. North-Eastern Centre. "The Application of Gas-Turbine Technique to Steam Power," by J. F. Field. (Joint meeting with the N.E. Branch, Institution of Mechanical Engineers.)

King's College, 6.15 p.m. I.E.E. North-Eastern Radio & Measurements Group. "Recent Developments in Comparative Methods of Testing A.C. Electricity Meters," by S. F. Muson and R. E. Mell.

SHEFFIELD.—Royal Victoria Hall, 7.30 p.m. A.S.E.E. Sheffield Branch. Technical films, presented by J. C. Burkhard

Tuesday, 7th November

DERBY.—Electricity Showrooms, 6.30 p.m. I.E.E. East Midland Centre. Lecture on "Evolution of the Lighting Art," by Dr. J. W. T. Walsh.

LONDON.—Savoy Place, W.C.2, 6 p.m. I.E.E. Education Discussion Circle. Discussion on "Teaching Physics to Engineers."

WORCESTER.—Works Institute, Hylton Road Power Station, 7 p.m. I.E.E. South Midland Centre. District meeting. "Science in Relation to the Electrical Industry," by Dr. W. Wilson.

Wednesday, 8th November

BIRMINGHAM.—James Watt Institute. I.E.E. South Midland Students' Section. "Modern Circuit Breakers," by R. H. Klotz.

Chamber of Commerce, New Street, 7 p.m. A.S.E.E. Birmingham Branch. Film, "Portable Electric Tools."

BRADFORD.—Midland Hotel, 7.30 p.m. A.S.E.E. Bradford Branch. "Electrification in the Dales," by J. L. Browell.

EDINBURGH.—Heriot-Watt College, 7 p.m. I.E.E. Scottish Centre. "A Review of Some Television Pick-up Tubes," by Dr. J. D. McGee.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. "Low-Frequency Radio-Wave Propagation by the Ionosphere, with particular reference to Long-Distance Navigation," by C. Williams.

MAIDSTONE.—Royal Star Hotel, 8 p.m. A.S.E.E. Kent Branch. "Factory Electrical Maintenance," by A. C. Witts.

NORTHAMPTON.—Northampton and District Electrical Association, 7.15 p.m. "Coloured and Direction Light as applied to the Stage," by L. G. Applebee.

SCUNTHORPE.—Technical School, 7 p.m. I.E.E. Sheffield Sub-Centre. Discussion on "Electrical Equipment of a Blooming Mill."

Thursday, 9th November

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. Lecture on "Some Electromagnetic Problems," by Prof. G. W. O. Howe.

LEEDS.—Parkway Hotel. Leeds Electrical Club. Dance and buffet.

LEICESTER.—E.M.E.B., Charles Street, 6.30 p.m. I.E.S. Leicester Centre. "Some Aspects of Colour in Relation to Discharge Lamps," by A. E. Bird.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Utilization Section. "Some Notes on Electrical Installations in Large Chemical Factories," by D. B. Hogg.

MANCHESTER.—College of Technology, Sackville Street, 6 p.m. I.E.S. Manchester Centre. "Lighting in the New House of Commons," by Veronica Demuth. (Joint meeting with the School of Architecture, Manchester University.)

RUGBY.—E.M.E.B. Showrooms, High Street, 6.30 p.m. I.E.E. Rugby Sub-Centre. "Some Electrical Methods of Measuring Mechanical Quantities," by F. J. Woodcock.

SWANSEA.—Plaza Cinema, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. Address by G. D. Arden, chairman of the Western Centre.

TREFOREST.—Glamorgan Technical College, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). "Choice of Switchgear in the Mining Industry," by E. V. Mellor.

Friday, 10th November

ABERDEEN.—Robert Gordon's Technical College, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. Lecture on "Some Electromagnetic Problems," by Prof. G. W. O. Howe.

LONDON.—Grosvenor House, Park Lane, W.1. 8.30 p.m. to 2 a.m. Electrical Industries Benevolent Association. Annual ball and cabaret.

Connaught Rooms, W.C.2, 5.30 for 6 p.m. E.P.E.A. South Eastern Division. Annual dinner and dance.

NOTTINGHAM.—Electricity Showrooms, Smithy Row, 7.30 p.m. A.S.E.E. Nottingham Branch. "Television, Past, Present and Possible Future," by H. A. Fairhurst.

STAFFORD.—King Edward Grammar School, 7 p.m. I.E.E. North Staffordshire Sub-Centre. "Design of Power Transformers to withstand Surges due to Lightning, with special reference to a New Type of Winding," by A. T. Chadwick, J. M. Ferguson, D. H. Ryder and G. F. Stearn.

Saturday, 11th November

BLACKPOOL.—Cliffs Hotel, North Shore. I.E.E. North Lancashire Sub-Centre. Dinner-dance.

Electricity Supply Finance

Mr. D. H. Kendon's Personal Views

FINANCE was the theme of the address of Mr. D. H. Kendon (deputy chairman, Midlands Electricity Board) as chairman of the South Midland Centre (Birmingham) of the Institution of Electrical Engineers.

How could the engineer use the " money picture " to help him direct the industry? He could control revenue as well as expenditure, so Mr. Kendon considered the extent to which he should do so in the interest of consumers. The principle of designing tariffs to meet the fixed kW cost and permit longer-hour use at low kWh cost still held good. The new tariffs which would replace the great variety at present available would follow the same principle. But cost components had changed so much relatively to one another that it was no longer in keeping with reality to obtain the bulk of the revenue from the fixed rather than the running portion of the charge made for electricity.

Domestic Flat Rate?

The time might not be far off when the whole revenue might be obtained from a flat rate per kWh without any fixed charge or higher priced primary kWh-block. The two-part tariff, domestic and industrial, had admirably served its purpose. A tariff of that sort would still be required, but extended use of electricity might enable a very simple flat rate to be charged for all domestic purposes.

While tariff structure would continue to have an important effect on development, an even greater influence would be that of an energetic educational policy and the selling of loads which were known to improve the load factor of the system. For instance, the sudden replacement of ten thousand 1-kW kettles by an equal number of 2-kW kettles would not alter the demand made on the system, because the greater wattage would be " on " for exactly half the time, diversity would spread the load and kettle losses would occur for half the time. The maximum demand would not depend upon kettle loading but on the need for hot water and desire for cups of tea.

Again, contrary to common belief, the use of " instantaneous " water heaters would result in a lower demand than that of immersion heaters in lagged storage tanks and also fit in better with the system maximum demand. Similarly, with farm equipment low loaded hammer mills were cheaper to purchase but would not lower the combined demand on the system.

Plant Efficiency

Turning to the cost aspect of the " money picture," he said that the best 5 per cent of existing generating plant had a thermal efficiency of over 26 per cent, whereas the worst 5 per cent could not do better than 12 per cent. If the latter portion of plant were renewed, approximately three-quarters of the interest and depreciation charges on the present very high capital cost of renewal would be met by savings made in the cost of energy it produced; it would not have to come wholly from increased prices to consumers.

Interest and depreciation charges absorbed 25 per cent of the revenue. Sufficient provision did not appear to have been made for depreciation in the past. It should be based on the real service life of plant, now known from experience, not on assumptions made thirty years ago. But Mr. Kendon did not agree that sufficient reserves should be accumulated to replace assets at current prices. If, he suggested, the principle that the user must bear the cost were accepted, then to-day's user should pay what the existing asset cost while to-morrow's user must pay more when the new (more costly) asset had been provided.

Electrical Industries Ball

There are still a few tickets, at two guineas each, available for the Electrical Industries Ball at Grosvenor House, Park Lane, London, W.1, on Friday, 10th November. Applications should be made to the secretary, Electrical Industries Benevolent Association, 32, Old Burlington Street, London, W.1.

Recovery of Premises

Position of a Business Tenant

By F. E. SUGDEN, A.C.I.S., BARRISTER-AT-LAW

IN the past I have dealt with the Rent Restriction Act and the Landlord and Tenant Act, 1927, with special reference to the recovery of possession of business premises by the landlord.

There appears to be an epidemic of threatened evictions and some electrical contractors have suffered hardship through loss of their businesses as a consequence of recovery of their premises. In some cases the landlord has alleged that the contractor no longer resides on the premises and therefore is not entitled to the protection of the Rent Restriction Act.

There have been cases where this has been true because of the bad condition of the premises through non-repair by the landlord, or the failure to make good war damage. The tenant has very properly asked whether he has any right of appeal to a higher court.

Financial Hardship

There are many instances where a case could be reconsidered, but in this article I wish to confine myself to the case of financial hardship, because I propose, in my next article, to explain how a contractor is entitled to have his case reconsidered in the Courts, if he can prove certain facts.

As will be appreciated, the landlord is compelled to offer the tenant alternative accommodation for the residential portion of the premises only, but where the electrical contractor has a combined house and shop he is, of course, protected by the Rent Restriction Act provided his premises come within a certain net rateable value: £100 in London, £90 in Scotland and £75 in the provinces. But even though the landlord is not compelled to offer the tenant alternative accommodation for the business portion of his premises, the tenant is entitled to redress or consideration in reference to the financial loss which he would sustain if he were turned out of his premises.

For instance, if a contractor has been in occupation for many years and has built up a goodwill and if he can show that he will suffer as much damage, financially, as if the premises were taken under the Landlord and Tenant Act, 1927, then he is entitled to legal consideration.

Possession Action

I should like to quote a case which I mentioned many years ago and which was again referred to in the Courts some weeks ago as still being the law in all similar cases. The plaintiff owned two houses; she resided with her husband at one house and the defendant became the tenant of the other. This house contained a shop, a stockroom, four bedrooms, a living room and a scullery. The defendant's wife carried on a general business and his son carried on another type of business on the premises. The family had worked up a very good business which was their main source of income. As the plaintiff wanted the premises for her own occupation she applied to the County Court where the Judge gave her possession. Later, however, the Appeal Court reversed the County Court decision and gave judgment for the defendant tenant saying that the County Court Judge should have taken into consideration other circumstances that might affect the interest of the landlord or of the tenant in the premises, including financial hardship, which might be inflicted upon the tenant if an order for possession were made.

If a landlord obtains possession of the premises, shall I say improperly, then the tenant should apply to have the judgment set aside or, at least, apply for a new trial. If the tenant is successful no doubt the Judge will make an order as regards costs in his favour and he will avert the danger of losing the goodwill of the business which might run into thousands of pounds. The procedure to be adopted for having the order set aside or obtaining a new trial will be dealt with in a future article.

Commerce and Industry

Instrument Industries' Exhibition

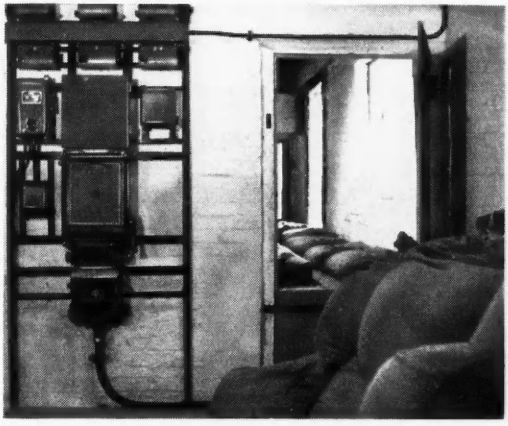
Scholarships for Overseas Students

THE first British Instrument Industries' Exhibition will take place at the National Hall, Olympia, from 4th to 14th July, 1951. It is supported by the British Electrical & Allied Manufacturers' Association, the British Industrial Measuring & Control Apparatus Manufacturers' Association, the British Lamblown Scientific Glassware Manufacturers' Association, the Drawing Office Material Manufacturers' & Dealers' Association and the Scientific Instrument Manufacturers' Association of Gt. Britain, Ltd.

The purpose of the exhibition is to show scientific and industrial instruments of entirely British manufacture and, with the export market in mind, supporting associations and the organizers, F. W. Bridges & Sons, Ltd., are approaching potential overseas buyers through all appropriate Government, commercial and professional channels. Members of the supporting associations have a priority for reserving stand space but non-member firms may apply for space to the British Instrument Industries' Exhibition, 641, Grand Buildings, Trafalgar Square, London, W.C.2 (telephone : Whitehall 0568).

Farmers Inspect Grain Drying Plants

A novel method of dealing with inquiries for electrical agricultural equipment has been adopted by the Fens Sub-Area of the Eastern Electricity Board. Conducted by Mr. P. Sydney, Sub-Area commercial officer, and Mr. E. A. Holland, Sub-Area agricultural officer, twenty-five farmers from the Cambridge and Ise of Ely districts inspected the grain drying and grain storage plants on the following farms :—Mr. F. C. Stiles, Willow Grange Farm, Chittering; Group Captain J. R. A. Peel, Kingston Wood Farm; Mr. H. C. Roads, Highfield Farm, Kneesworth; and Mr. E. O. Squire, Basmead Farm, Eaton Socon. Several authorities on rural electrification accompanied the party, and Lt. Col. A. E. Knights, manager, Fens Sub-Area, joined the party at Royston where he entertained them to lunch at the Bull Hotel.



Control panel at Basmead Farm, Eaton Socon, where Fens farmers inspected an in-sack dryer

Revised Iron and Steel Prices

Under the Iron and Steel Prices (No. 4) Order, 1950 (S.I. 1950 No. 1699) the maximum prices of a limited range of products are amended as from 24th October.

E.I.B.A. Collections

Mr. Arthur S. Lowe, secretary of the Electrical Fair Trading Council, tells us that the E.I.B.A. collection plate is always in evidence at the meetings of the Council, and the amount collected in this way over the financial year just ended totalled £15 8s.

F.B.I. Overseas Scholarships

A young electrical engineer from Chile who recently arrived in this country for a course of practical works training is the first of 100 overseas engineering graduates to be offered scholarships in the first year of the F.B.I. overseas scholarship scheme. Scholarships are offered for two-year periods and students are chosen by local Overseas Selection Committees, half of the members of which are nominated by the F.B.I. and the other half by the overseas Government concerned. Selection is

subject to the final approval of the Committee in London. The Governments of Ceylon, Chile, Iran, Pakistan, Rhodesia, Sudan, Turkey and Uruguay have agreed to co-operate and other countries likely to participate are Australia, New Zealand, India, South Africa as well as other Latin-American countries.

Cable for Yugoslavia

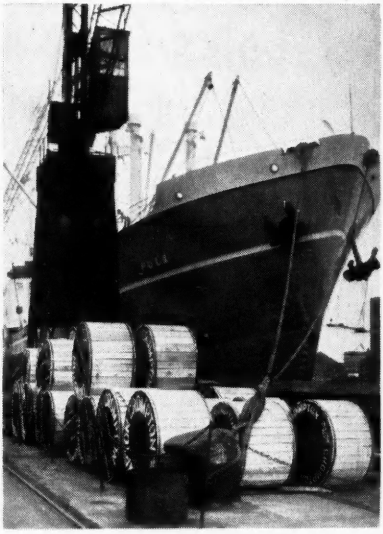
A £36,000 order for paper insulated high voltage cable manufactured at the Derby Cable Works of Crompton Parkinson, Ltd., was recently despatched to Yugoslavia. This is the second large order supplied to Yugoslavia this year. The previous order, valued at £35,000, was for nearly 63 miles of rubber insulated cable. The cable, of a total length of 64 miles, was supplied in 202 drum lengths and was shipped in the s.s. *Pula*. It is of standard design made in accordance with the formulæ of the Cable Makers' Association.

Plastics Travelling Exhibition

The private exhibition of Bakelite, Ltd., which has visited Brussels, Oslo, Stockholm, and London, will be arriving in Liverpool at the end of November. The exhibition will be held in the Produce Exchange Room, 24, North John Street, Liverpool, and will remain open from 28th November to 1st December. Of particular interest will be the full scale replica of a mess and a single-berth cabin in the crew's quarters of a typical modern collier, based on the crews' quarters in the B.E.A. colliers *Cliff Quay* and *Charles Parsons*. "Warerite" laminated plastics have been adopted for surfacing the main bulkheads, while bulkheads athwartships consist of plywood which has been surfaced on both sides with "Warerite" veneer. "Warerite" plastics are also used to surface flush doors, the mess table, and a shelf and collapsible table in the cabin.

George Forrest & Sons

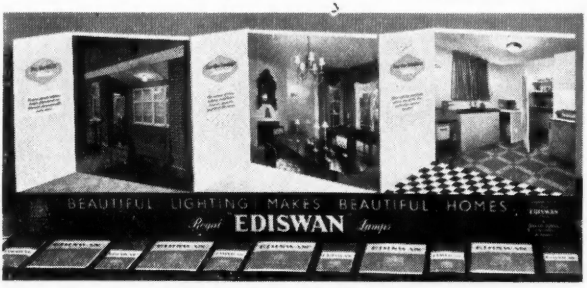
The firm of George Forrest & Sons has been taken over as from 16th October by Thorn Electrical Industries, Ltd., who will continue the business as a self-contained organization. A reconstruction of the internal organization of the firm is proceeding and inquiries and orders should for the time being be sent to Mr. H. H. Ballin, manager, Lighting Division, Thorn Electrical Industries, Ltd., 30, Osborne Road, London, W.3. Mr. L. Davis, who has been associated with George Forrest for many years, has taken charge of the Design Department.



Crompton paper insulated cable being loaded on board ship for despatch to Yugoslavia

Lamp Publicity

An attractive cut-out for window display purposes has been issued by the Edison Swan Electric Co., Ltd., as part of its lamp publicity. This illustrates the application of lamps to interior decoration and bears the caption "Beautiful lighting makes beautiful homes." It has been produced in two sizes, one for smaller windows and a larger size, approximately 10ft in length, for special display windows. The cut-out is intended as a centre-

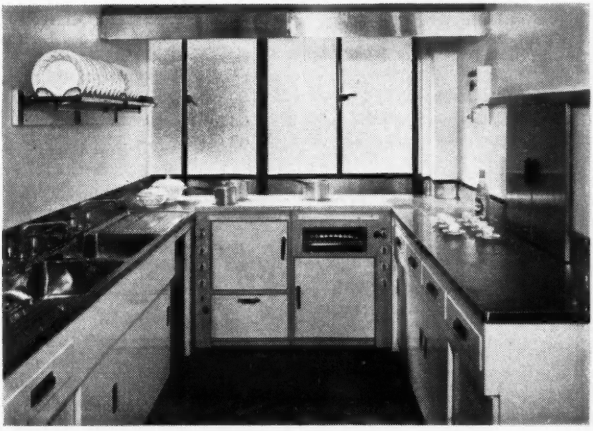


New "Ediswan" cut-out for lamp window displays

piece for other display material and various types of lamps recommended for special purposes.

Heavy Duty Cooking Equipment

In the accompanying picture we show a "Creda" heavy duty cooking installation in the directors' dining room kitchen of Tate & Lyle, Ltd., Fenchurch Street, London. This restaurant range has been specially designed by the Simplex Electric Co., Ltd., for small restaurants, cafés, hotels or large private houses, and will cook economically for six, sixteen or sixty people. It incorporates a large and a small oven, both thermostatically controlled. A separate grill is provided. The grill grid and the grill pan are attached so that when the grid is withdrawn for inspection or removal of meat the fat and gravy are caught in the grill pan. Another new feature is the completely self-contained and separately heated plate warming drawer. There are five hotplates and fuses are protected by drip-proof covers. The range is built of sheet steel with a cast iron frame and hob.



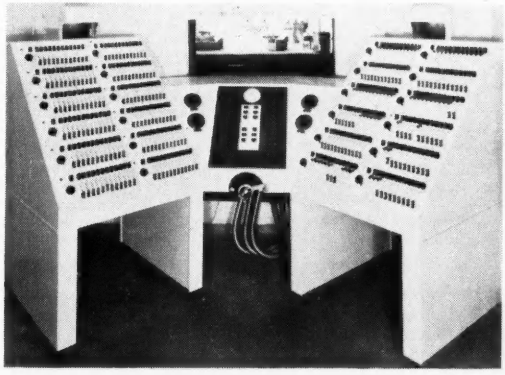
New "Creda" heavy duty cooking equipment installed at the London offices of Tate & Lyle, Ltd.

Contract Price Adjustment Formulæ

The latest figures for use in the B.E.A.M.A. contract price adjustment formulæ are as follows: "Rates of Pay": the rate of pay for adult males at 14th October shall be deemed to be 115s (unchanged). "Costs of Material": the latest figure for intermediate products published by the Board of Trade (14th October) is 308.0—the figure for September (against 295.6 for August).

Stage Lighting Control

When we visited the New Theatre, St. Martin's Lane, last week we saw a demonstration of the first thyratron controlled stage lighting system to be permanently installed in a London theatre. Developed by the Strand Electric & Engineering Co., Ltd., this 144-way control system has a number of advantages over methods employing either wire-wound resistances or saturable reactors. For example, there is no heat to be dissipated with its associated wastage of power; there is no time-lag in its operation; and the control desk is so compact that it can be operated with ease by one man. Maintenance has received a good deal of attention. the equipment being controlled along the simplest possible lines with the control lever and switch for each



The recently installed Strand Electric stage lighting control desk at the New Theatre, London

circuit in the form of an easily replaceable plug-in unit. The complete system was described in detail in the *Electrical Review*, 19th August, 1949, page 341.

Trade Announcements

By mutual agreement the selling arrangement by which Bearings & Associated Industries, Ltd., were sole representatives for the **British Manufactured Bearings Co., Ltd.**, of Crawley, has been discontinued. A new company, B. M. B. (Sales), Ltd., has been formed for the purpose of providing sole sales representation for the British Manufactured Bearings Co., Ltd. In future all sales inquiries and orders for B. M. B. miniature steel balls and bearings should be addressed to the new company at 2, Balfour Place, Mount Street, London, W.1 (telephone : Grosvenor 3155).

Mr. G. Fullwood has been appointed as a representative of **Simpson, Baker & Co., Ltd.**, and is operating in the counties of Derbyshire, Nottinghamshire and Leicestershire.

The registered and head office of **Electrical Components, Ltd.**, is now Components House, Ludgate Hill and Lionel Street, Birmingham, 3 (telephone : Collmore 4184; telegrams : Clip, Birmingham).

Dimplex, Ltd., have appointed A. Caldwell Young & Son, 200, St. Vincent Street, Glasgow, C.2, as agents for their radiators in Scotland.

Wheeler Electrical Supplies (Wholesale), Ltd., are moving to larger premises at "The Electrical Warehouse," 150, Burton Road, Derby.

The **Elkay Electrical Manufacturing Co., Ltd.**, has removed to 42, Woburn Place, London, W.C.1 (telephone : Langham 1975).

G. H. Lucas & Co. (electrical manufacturers' agents) have removed to 7, Albert Place, Bridge Street, Manchester, 3. They have recently added the agency for the northern counties of Ranton & Co., Ltd., bakelite accessories manufacturers.

New House of Commons

In our description of the new House of Commons building on 20th October we stated that the batteries for the "Keepalite," the Gent electric clock and the Exchange Telegraph annunciator systems were all of Chloride manufacture. Actually for the annunciator system 190 "Ediswan" C2S enclosed type cells were used exclusively.

Agricultural Sales Course

The South Western Electricity Board has recently organized at Taunton an intensive three-days' agricultural sales course at which nearly fifty representatives heard lectures by Mr. C. A. Cameron Brown, agricultural adviser, B.E.A., and other experts on sales methods and the application of electricity to farming. The course was introduced by Mr. L. V. Turner, Taunton Sub-Area manager, and was conducted by Mr. W. J. Guscott, the Board's development and planning officer, who, in addition to describing the Board's agricultural development organization, and the line rentals scheme, gave some advice on the specialized art of selling to the farmer. Mr. Cameron Brown spoke on the general subject of "Power on Farms." Mr. P. Wakeford and Mr. J. A. Dow, of the B.E.A.'s agricultural advisory staff, talked about dairy applications, crop drying and poultry applications.

Tax Free Hotel Equipment

Mr. Harold Wilson, President of the Board of Trade, recently expressed surprise and disappointment at the small number of applications for Government grants to enable hoteliers to improve their establishments in order to attract more visitors from Canada and the United States. The Electrical Development Association and some of the Electricity Boards are circulating 100,000 leaflets among hoteliers drawing attention to the Board of Trade's scheme and the wide range of electrical appliances relieved of Purchase Tax which can be installed to make establishments more comfortable for transatlantic visitors. Copies of the leaflet can be obtained from electricity service centres or from E.D.A., 2, Savoy Hill, London, W.C.2.

Catalogues and Lists

Fuel Efficiency Co., Ltd., 20, Upper Ground, London, S.E.1.—Technical brochure on boiler plant thermostatic control systems.

Pantak, Ltd., London Road, Slough.—Leaflet on a mobile X-ray equipment for detecting flaws in metal.

Lumsden Lamp Co., Millburn, Almondbank, Perth.—Priced folder on lamps for ultra-violet and infra-red treatment.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Priced folder giving suggestions for electrical Christmas presents.

Londex, Ltd., Anerley Works, 207 Anerley Road, London, S.E.20.—Technical leaflet describing a range of flameproof relays, pressure switches and similar units.

Thermega, Ltd., 51-53, Victoria Street, London, S.W.1.—Illustrated folder and price list of "Thermega" electrically heated pads and blankets.

Communication Systems, Ltd., Strowger House, Arundel Street, London, W.C.2.—Illustrated brochure (No. 1129) on automatic telephone equipment for installation in ships.

Frequency Control in Radio

Present Practice and Future Developments

THE evolution of modern radio systems has depended to a very large extent on the provision of highly stable frequency generators and in his inaugural address as chairman of the Radio Section of the Institution of Electrical Engineers in London recently Capt. C. F. Booth (Post Office Research Station) described the developments in methods of frequency control.

The limitations of the spark transmitter in respect of frequency stability and band width were well known, he said, and it was not until the high-frequency alternator, the arc and the valve were used that radio transmitters possessed well-defined frequencies. These c.w. systems led to the need for improved frequency stability, and, over the past 20 years, there had been a steady tightening of internationally agreed frequency tolerances.

The performance of the valve transmitter had steadily improved since the application of low-power drive units, originally using LC circuits, then tuning forks and, more recently, quartz crystals, for the frequency-determining elements. To-day crystal control was commonly employed up to at least 100 Mc/s, frequency multiplication being used for the highest frequencies.

Advances in radiocommunication depended largely on precise measurement. This was particularly true of frequency control, and the evolution of frequency standards had set the pattern of the devices used for transmitter frequency control. To-day the crystal-controlled oscillator was the best working standard, its absolute frequency being known to within 2 in 10^8.

With regard to the future, continuing pressure would be exerted to meet increasingly tight tolerances and to raise the frequencies at which they could be realized.

During the next few years quartz clocks might become available with closely predictable annual frequency ageing rates of less than 1 in 10^8 and capable of several years' continuous operation, the rate of the clock being checked independently of the earth's period, using molecular resonance.

Capt. Booth concluded with a discussion of frequency control which illustrated the need for a simple method of quoting frequency stability. A method worthy of consideration was to express this in terms of the common logarithm of the reciprocal of the frequency variation when the latter was expressed as a fraction. For example, an oscillator subject to frequency variations of 1 in 10^6 would have a stability of 6 stability units.

Telecommunications

Forecast of Future Trends

SOME of the ramifications of the G.P.O. telecommunications system were outlined by Mr. W. F. Smith (chief regional engineer, North Eastern Region, G.P.O.) in his address as chairman of the North Midland Centre (Leeds) of the Institution of Electrical Engineers.

Mr. Smith said that the telephone system had grown to 5·3 million "stations," or by 36 per cent in five years; trunk and toll calls totalled 226 million in 1949 and local calls reached 2,911 million. It was presumed that a population of 50 million would require ten million telephones and the problem was: where would the next five million subscribers be situated? Telecommunication services suffered more than any other from the vagaries of forecasting.

There was nothing spectacular to record about the development of local line networks; changes made had aimed at more economical use of plant and deferment of the exhaustion date of underground ducts. Mr. Smith indicated how coaxial cables had enabled the number of channels that could be transmitted over one pair of conductors to be increased, so helping to reduce the cost per channel. In the near future 960 channels would be possible over one pair of conductors. The cost of internal equipment for such circuits now far outweighed the cost of cable, being about 90 per cent of the total for a 960 circuit route of 100 miles length.

Integration of the telegraph and telephone networks had enabled telegraph circuits to be

manually switched, resulting in increased speed of transmission and economies in operating cost. The automatic switching of telegraph circuits would soon be in use, with further economies.

How far submarine cables could be exploited was an economic question. The use of more submerged repeaters would make available more speech channels, but power supply difficulties increased enormously with distance from the shore end.

In a large system there was hardly time to standardize before research rendered obsolete that which had hardly lived. Materials were scarce and buildings not available; "miniaturization" of equipment might help, but the limitations were the amount of heat it was possible to dissipate and less accessibility. Advances in electronics had enabled as many as 500 subminiature valves to be accommodated in one cu ft of space, but the resulting temperature was 115 deg C.

Review of Circuit Development

Another aspect of telecommunications was dealt with by Mr. R. E. S. Soper (Pirelli-General Cable Works, Ltd.) in his address as chairman of the Southern Centre (Southampton) of the Institution. He surveyed the main types of speech channels used in telephony and detailed problems encountered and the means by which they were solved to enable the circuit to be successfully applied in practice. It so happened, he explained, that each new idea had either prolonged the life of certain types of circuits already in use or had resulted in the reintroduction of others, so that none had ceased to exist entirely.

One disadvantage of coaxial cable systems was that to take out even one speech channel necessitated a large quantity of expensive and complicated equipment. Coaxial systems were therefore not economical unless a large number of channels were required between two points a considerable distance apart.

The swing of costs from cable to apparatus had made economic studies more important than ever when designing a telecommunication network. Another thing was the size and number of buildings required to house the equipment, for whereas each pair in an audio-cable required amplifiers spaced 60 miles apart, one amplifier would handle all the channels in a coaxial cable but the spacing was reduced to 6 miles apart. In addition, the terminal equipment of a coaxial system required a very large building.

Looking into the future, it now seemed certain that multi-channel telephony technique would be applied to radio circuits at frequencies which limited transmission to the optical range. Greater distances would necessitate radio-repeater stations on the lines of those employed in the existing radio-television link.

One big advantage of a cable system was that the circuits were screened against interference from external sources, which would also be true of waveguide systems if they were ever developed as a practical means of providing long distance communication channels. Should they be, a 5in diameter waveguide and 30,000 Mc/s carrier would provide several thousand channels with amplifiers spaced 80 miles apart.

GEO-THERMAL POWER

ABOUT two years ago the New Zealand Government geologist, Mr. Osigley, visited Italy on the Government's behalf to investigate the methods employed there of using geo-thermal steam for the generation of electricity. His report was sufficiently favourable to encourage the Government to allot an initial sum of about £100,000 for experimental purposes. Wairakei, a few miles from Rotorua, was the preliminary area selected. The general plan of investigation now being carried out is the spacing of a line of deep bores—up to 1,000ft—along a two-mile valley at Wairakei. Of the drilling plants in action four drive 4in bores and the fifth a 6 or 8in bore. The aim is to discover deep steam reservoirs to provide a steady supply. If successful, similar investigations will be made in other areas in New Zealand.

Pohutu Geyser at Whakarewarewa, Rotorua

Underground Power Station

Features of the Lavey Undertaking

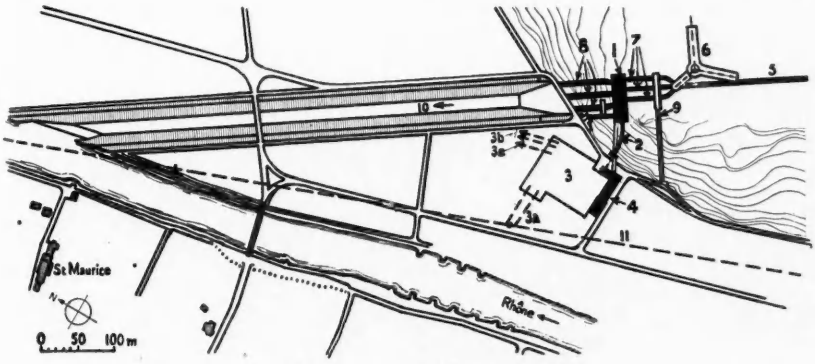
DURING a recent visit to Switzerland we were able to inspect the new hydro-electric station constructed for the City of Lausanne at Lavey (Canton Vaud). The power house of this low-head undertaking (40 metres) is underground in the right bank of the Rhône. It is thus situated mainly because of the geological character of the valley ; the unstable alluvial soil would have necessitated special expensive measures in the construction of a surface station. Wartime security was a secondary reason for placing the station underground. The decision added only about two million Swiss francs to the cost of construction ; the total was between 60 and 70 million francs (£50–£58 million).

From a dam on the Rhône at Evionnaz, over three miles from the station, water is taken by a tunnel about 25·4ft in diameter, cut into the rock, to the surge chamber whence it goes through three 246ft long penstocks to the machine hall. The completed station will have three sets ; at the time of our visit one of these was in operation and the second being erected. The water flows back into the river through a 760yd long tailrace.

Each set is rated at 29,400 kVA, at 0·8 p.f., and generates at 10 kV ± 12 per cent, the normal speed being 214 r.p.m. The 33,000 h.p. Kaplan turbines of the first two sets were built by Charmilles S.A., Geneva, and the Ateliers de Constructions Mécaniques S.A., Vevey. On an extension of the shaft are mounted a 5 kW 85 V main exciter and a 2 kVA 110 V auxiliary alternator supplying the motor of the turbine governor.

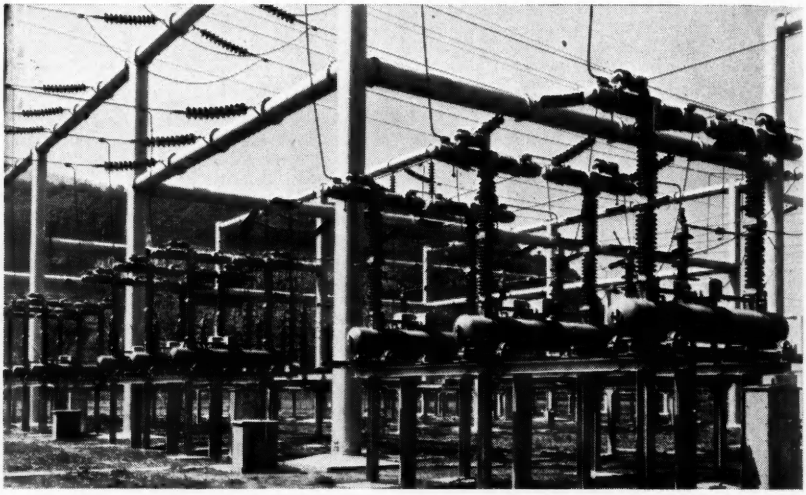
The alternators are so erected that only the upper bearing brackets and the exciters project above the floor of the machine hall. There are two guide bearings and the weight of the rotating part of the whole set is carried by a thrust bearing in the upper bearing bracket. The thrust and upper guide bearings are situated in an oil bath which also forms the centre part of the upper bearing bracket.

The stator frame is in two sections and is built up from sheet-steel plates and iron sections welded together. Four cast steel rings form the ring of the rotor ; these are shrunk on to the eight-armed spider. The alternator shaft is a single forging with a central bore to take the pressure oil pipes required for regulating the Kaplan runner blading.



Layout of the Lavey hydro-electric undertaking

1, Underground power house ; 2, entrance gallery ; 3, outdoor switchgear ; 3a, 135 kV outgoing lines ; 3b, 60 kV outgoing line ; 4, building for 10 and 6·4 kV switchgear ; 5, water tunnel ; 6, surge chamber ; 7, penstocks ; 8, tailrace ; 9, gallery to valve chamber ; 10, tailrace channel ; 11, 135 kV power line of E.O.S. system.



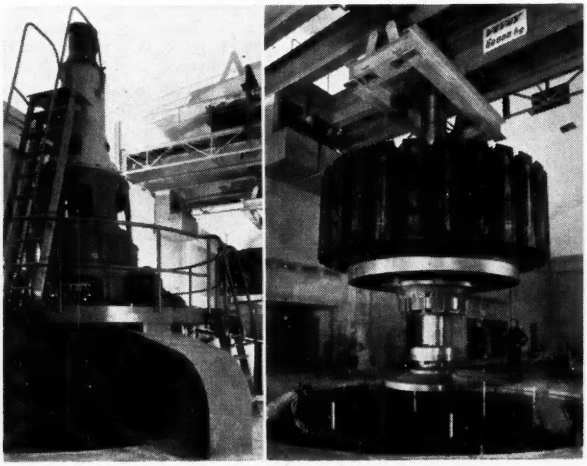
View of the outdoor air-blast switchgear

The lower guide bearing is self lubricated and water cooled, the rotation of the shaft alone producing adequate oil circulation.

Braking of the rotor is accomplished by six pairs of brake shoes with non-metallic lining which bear on the inside and exterior of a separate cast iron braking ring, being actuated by compressed air operated plungers.

The three alternators, each rated at 29,400 kVA, feed a 10 kV double busbar system and, through three main transformers, a 135 kV double busbar system. From the latter three 135 kV overhead lines are taken, one going directly to Lausanne and the others to the neighbouring system of l'Energie de l'Ouest Suisse (E.O.S.).

The 135 kV transformers are a variation of the shell type in which the magnetic circuit is formed by a core with radial laminations combined with U-shaped yokes fixed to the periphery of the core. The windings consist of cylindrical coils with paper-insulated conductors. The h.v. winding lies between the two halves of the l.v. winding and is insulated by an oil-impregnated paper cylinder splayed at the two ends of the limb to form flanges. A close-fitting



Left: The first of the 29,400 kVA sets. Right: Rotor of second set being placed in position

cylindrical tank contains the whole and the amount of oil required is much less than in the normal type.

All the h.v. switching equipment is situated in the open and is mounted on high frames to keep it above the winter snow level. It is well spaced, making supervision much easier. Brown, Boveri type " DCF " high-speed air-blast circuit breakers with multiple breaks are employed. The 135 kV units have a rupturing capacity of 2,500 MVA and those of 60 kV a capacity of 1,000 MVA. They operate in 0·06sec. If the operating conditions require it later, rapid reclosing mechanism can be added easily and inexpensively.

High-speed air-blast breakers are also used in the indoor distribution station operating at 10 and 6·4 kV. Although these are relatively low voltages it was necessary to employ very robust construction because of the large dynamic stresses set up by the high operating and short-circuit currents anticipated. This is particularly applicable to the three-pole isolating switches which are fitted with compressed air control operated from the inspection gangway or remotely from the control room.

In the underground station is the 6·4 kV distribution gear required for a 1,300 kVA auxiliary set (comprising a horizontal Francis turbine and generator), a 350 h.p. Sulzer diesel set which acts as a stand-by, and the connecting cables to the equipment in the switch house. This gear is also of the oil-less type and thus free from fire risk.

There is very comprehensive equipment for protection, voltage regulation and automatic sychronization. The 135 kV lines are protected against short circuits by high-speed distance relays.

Compressed air for the switchgear, voltage transformers and remote controls is provided by two compressor sets delivering about 20 cu ft/min at 427 lb/sq in. These are operated automatically and supply six 18 cu ft air receivers, three of which are at the outdoor switching station.

It is claimed that the Lavey station, the first low-head underground installation in Switzerland, embodies many innovations to give greater reliability and economy and is in many respects a pioneer plant. With the first two sets in operation the annual output is expected to be 268 million kWh and the output of the completed station 326 million kWh.

Practically the whole of the equipment, apart from the turbines, has been manufactured and supplied by Brown, Boveri & Co., to whom we are indebted for the opportunity of seeing the station.

Measuring Motor-Car Strains

THE employment of resistance-wire gauges for measuring strains in the wheels and body structures of road vehicles is explained in some detail in a paper by Messrs. J. R. Bristow, P. Metcalf and C. H. G. Mills (all of the Motor Industry Research Association) being presented at certain centres of the Automobile Division of the Institution of Mechanical Engineers.

The properties of gauges of this kind and the way in which they are attached for use are first described, their limitations and factors which affect their accuracy being indicated. There follows an account of the measurement, with the aid of a simple Wheatstone bridge circuit and galvanometer indicator, of static strain in omnibus wheels due to tyre inflation and axle load.

Determination of dynamic strain in the frame and superstructure of a double-deck omnibus in road service is discussed and a description is included of a four-channel recorder for this purpose, which has been developed by the Motor Industry Research Association as a portable outfit. It consists of an a.c. polarized bridge and oscillator with amplifiers and cathode-ray indicators. Records are obtained by photographing the tube screens and the outfit is energized by a 200 W 230 V motor-generator driven by four 6 V batteries.

Yorkshire Rural Supplies

SKIPTON R.D.C. has approved plans of the Yorkshire Electricity Board for an overhead line from Flasby to Winterburn and another to supply the south-eastern portion of Cracoe. It was agreed to make representations to the Ministry of Fuel, urging the provision of electricity supplies for Hetton, Rylstone and Winterburn, and to seek also the assistance of the Ministry of Agriculture.

WEST GERMAN ELECTRICAL TRADE

Growing Volume of Exports

ELECTRICAL exports from the western zones of Germany last year totalled Dm.95,877,000 in value against Rm.28,594,000 in 1948 and Rm.258,314,000 from the whole of the Reich in 1936. Values of the exports of the chief groups with leading destination and notes of increases and decreases (very few) on 1948 are shown in the accompanying table.

Electrical imports last year totalled Dm.28,732,000 in value, of which Dm.7,860,000 represented dynamos, motors, convertors and transformers; Dm.7,303,000 radio goods; Dm.4,138,000 metallic filament lamps; and Dm.1,420,000 measuring, etc., instruments.

Class of Goods and Destinations	1949 Dm (000)	Inc. or dec. on 1948 Dm (000)
Dynamos, motors, convertors and transformers up to 10 kg.	538	− 677
To Belgium	67	− 98
„ *Switzerland*	40	+ 40
„ *Holland*	76	− 89
„ *Norway*	12	− 324
„ *Sweden*	112	− 266
„ *Australia*	136	+ 74
Ditto, 10 to 25 kg.	520	+ 100
To Holland	162	− 30
„ *Belgium*	46	+ 26
„ *Sweden*	176	+ 26
Ditto, over 25 kg.	8,656	+ 7,836
To Norway	417	+ 387
„ *Holland*	1,180	+ 1,116
„ *Sweden*	1,240	+ 1,225
„ *Switzerland*	99	+ 72
„ *Turkey*	164	+ 164
„ *Austria*	1,375	+ 1,304
Complete armatures and commutators	3,417	+ 1,907
To Austria	1,668	+ 568
„ *Saar*	879	+ 716
Cable, underground or submarine	8,464	+ 7,804
To Holland	1,772	+ 1,771
„ *Denmark*	69	− 39
„ *Saar*	1,162	+ 1,095
„ *Belgium*	1,144	+ 1,144
„ *Uruguay*	1,708	+ 1,708
„ *Sweden*	853	+ 593
Telegraph material	779	+ 489
To Belgium	123	+ 69
„ *Holland*	184	+ 184
„ *Switzerland*	168	+ 132
„ *Norway*	60	− 9
Telephone material	3,343	+ 2,913
To Belgium	250	+ 160
„ *Spain*	203	+ 203
„ *Luxemburg*	106	+ 51
„ *Iran*	127	+ 127
„ *Holland*	811	+ 717
„ *Norway*	312	+ 219
Radio apparatus	3,578	+ 2,503
To Belgium	322	+ 99
„ *Holland*	235	+ 83
„ *Sweden*	1,059	+ 976
„ *Switzerland*	936	+ 609
Measuring, etc., instruments	7,344	+ 4,974
To Eire	345	+ 290
„ *Belgium*	451	+ 206
„ *Austria*	620	+ 612
„ *Italy*	330	+ 311
„ *Holland*	793	+ 376
„ *Sweden*	1,783	+ 1,120
Heating, cooking, etc., apparatus	1,560	+ 980
To Belgium	210	− 10
„ *Greece*	115	− 43
„ *Switzerland*	251	+ 191
„ *Luxemburg*	101	+ 83
Lighting, power transmission, switch, etc., equipment	23,500	+ 15,040
To Belgium	1,874	+ 1,018
„ *Norway*	1,815	+ 1,499
„ *Finland*	645	+ 303
„ *Holland*	5,533	+ 2,156
„ *Saar*	2,770	+ 2,770
„ *Switzerland*	1,029	− 95
„ *Austria*	1,414	+ 1,081
Lighting and starting equipment for i.c. engines	3,120	+ 2,760
To Hungary	1,609	+ 1,609
„ *Yugoslavia*	243	+ 243
„ *Sweden*	625	+ 530
Ignition, etc., equipment for heavy vehicles	7,303	+ 3,823
To Belgium	400	+ 120
„ *Holland*	562	− 885
„ *Sweden*	1,309	+ 1,014
„ *Switzerland*	955	− 296
X-ray apparatus	2,546	+ 1,606
To Holland	407	+ 75
„ *Sweden*	477	+ 348
„ *Hungary*	362	+ 361
„ *Denmark*	150	+ 150
„ *Brazil*	118	+ 111
Electro-medical apparatus	6,635	+ 4,015
To Holland	671	+ 70
„ *Sweden*	1,116	+ 454
„ *Switzerland*	713	+ 429
„ *Brazil*	582	+ 509
„ *Uruguay*	160	− 98

I.E.E. North-Western Centre

IT is fifty years since what is now the North-Western Centre, formerly known as the Manchester Section, of the Institution of Electrical Engineers was formed out of the Northern Society of Electrical Engineers which had been established seven years before. The background to that event was outlined by Mr. H. G. Bell (manager, No. 1 Sub-Area, N.W. Electricity Board) in his inaugural address as the new chairman of the Centre.

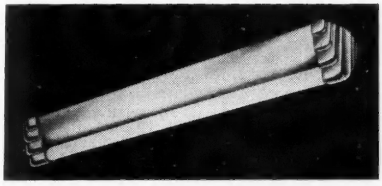
Mr. Bell recorded the early history of electricity supply in the city and neighbouring districts and commented on the beginnings of many now-famous manufacturing enterprises. Early endeavours to foster apprenticeship and technical education were spoken of, and reference was made to local professional associations.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Fluorescent Lighting Fitting

A FLUORESCENT fitting placed on the market by SMART & BROWN (ENGINEERS), LTD., Spennymoor, Co. Durham, for use with a 4ft 40 W tube is designed to ensure maximum light output and is ready for immediate installation. It is constructed of robust non-corrosive



Smart & Brown fluorescent lighting fitting

aluminium alloy and has a smooth easily cleaned exterior. There is a universal mounting bracket. Complete with "Hi-Craft" control gear and lamp, the price is £4 10s (plus purchase tax on the lamp in the U.K.).

Measuring Electrostatic Charges

In certain industrial processes and in the employment of some medical techniques the build up of electrostatic charges on insulated surfaces constitutes a grave risk of fire or explosion. To investigate such conditions a portable instrument capable of measuring electrostatic charge has been developed by the Dunlop Rubber Co., Ltd., and was described by D. Bulgin in the *Journal of Scientific Instruments*, Vol. 22, No. 8, August, 1945.

Recent developments to components, however, have enabled the BALDWIN INSTRUMENT CO., LTD., Brooklands Works, Dartford, Kent, to produce this instrument in a form convenient for general laboratory and workshop use. It operates on the principle that a small voltage, proportional to that being measured, is induced by capacitive coupling on to the grid of an electrometer valve. The anode current of the valve is measured by an indicating instrument which is calibrated to read in terms of the inducing voltage divided by the distance separating its source from the instrument. The measurement is thus of voltage gradient, or volts per foot.

This "Statigun" consists of a pistol-like body and grip which contains the batteries, switches and adjusting rheostats and the indicating instrument. A detachable cylindrical part contains the electrometer valve, the capacitance coupling plate, a gravity-operated setting switch and a sliding member controlling the sensitivity.

It can measure voltage gradients up to 2,000 V/ft and discriminates between positive and negative potentials and alternating potentials. Accessories enable it to be used for the measurement of charge from 1×10^{-16} coulomb/cm² to 2×10^{-7} coulomb/cm² and of resistance from 10^7 to 10^{15} ohms.

Press Switch

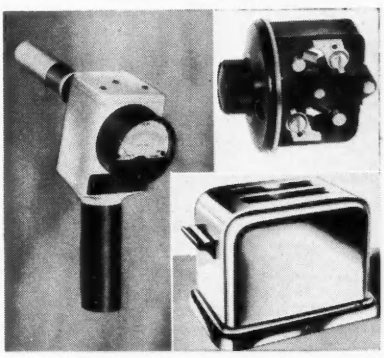
A double-pole quick make and break press action switch is offered by ARCOLECTRIC (SWITCHES), LTD., Central Avenue, West Molesey, Surrey. It is rated at 5 A 250 V and is suitable for either foot or hand operation.

Automatic Toaster

An automatic electric toaster brought out by DE RENZI, HOLMES & CO., LTD., Fox's Lane, Wolverhampton, toasts two slices on both sides at once, the bread automatically popping up when ready and the electricity being switched off at the same time. A clockwork mechanism gives a timing range between 1 and 3 minutes.

The toaster is manufactured of steel, with a

Left: Baldwin-Dunlop "Statigun." Right: Arcolectric double-pole press switch. Bottom Right: De Renzi, Holmes automatic toaster



highly polished chromium plated finish. Heat resisting plastic handles are fitted for easy lifting of the appliance. The retail price is 4 gns.

Oil-filled Towel Rail

The "S.T.C." oil-filled towel rail made by S. TIMINGS & CO., LTD., 88, Hamstead Road, Birmingham, 19, is made from 1¼in heavy gauge copper tube with cast brass ball joints, all chromium plated on nickel. The 100 W heater is easily replaceable. Two sizes are available: No. 1, 3ft by 3ft costing £10 15s (plus purchase tax in this country), and No. 2, 3ft by 2ft 6in, costing £10 5s (plus P.T.).

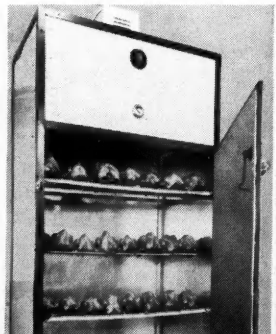
Smoking Kiln

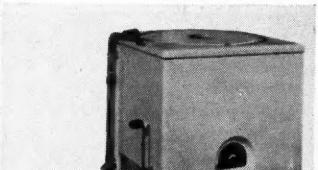
The "Myzer" smoking kiln made by the FRANKURE CO., LTD., 53, Long Lane, Smithfield, London, E.C.1, can be used for curing fish, or for smoking ham, sausages and poultry. As it consumes its own smoke, the kiln can form part of the furnishings of any retail shop. The apparatus comprises an attractive cream and black cabinet 7ft high, 3ft wide and 2ft deep. It is driven by a ⅓ h.p. motor.

Curing is carried out by igniting a small quantity of oak sawdust in a tray placed under the kiln. The smoke is driven through the cabinet by a system of fans and ducting. The heat is thermostatically controlled at any required temperature up to 190 deg F. When curing has been completed the "extractor" is switched on and within 20 to 25 minutes the cabinet is cleared of smoke.

The makers claim that fish can be cured in 2-8 hours and poultry can be thoroughly smoked in a few hours.

The model now coming on the market retails at £125. A streamlined model for export is in course of production and plans are in hand for a 60 stone unit.





Left: "Myzer" smoking kiln. Below: Thor "Stowaway" washing machine

Heated Mattress

An electrically heated interior-spring mattress introduced by THERMALUX ELECTRICAL PRODUCTS, LTD., Talbot Works, Lewis Street, Halifax, incorporates a thermostatically controlled heating element under the quilted covering on the side of the mattress. In average use of 30 minutes each night, which is said to be sufficient to all-over warmth before retiring, the mattress uses less than 1 kWh a week. Prices range from £22 10s (plus £4 17s 6d in this country) for the 3ft wide size to £30 (plus £6 10s P.T.) for the 4ft 6in wide size.

Space-saving Washing Machine

By the use of telescopic legs the "Stowaway" washing machine brought out by THOR APPLIANCES, LTD., 55-59, Oxford Street, London, W.1, stands at a height suitable for operation without stooping, but when not in use it occupies a space only 20in square by 25in high and can be pushed away, on its fitted castors, underneath the draining board or kitchen table, etc. A power driven pump is incorporated and a full-size power operated wringer fits into the body of the machine on a sliding guide tray when not in use.

Incorporating a specially designed agitator, the machine will deal with over 30lb of dry clothes in one hour, the tub holding 5½lb of dry clothes at a time. The apparatus is attractively finished in white or cream, with vitreous-enamelled top and stove-enamelled body. The price is £43 15s (plus £11 13s 4d P.T. in this country).

Arrangements have been made to give Parnall (Yate), Ltd., a limited licence to manufacture a cabinet type washing machine, in which will be included features of the Thor "Stowaway," but the retractable leg design will be retained exclusively for the "Stowaway." The Parnall machine will be sold under Parnall's trade mark and distributed in this country through the Electricity Boards. For the allied electrical trade, Thor Appliances, Ltd., are arranging to offer a similar cabinet type machine under the trade name "Gainaday."

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

Reports and Dividends

Falk, Stadelmann & Co., Ltd., report consolidated profits for the year ended 31st March last of £484,826, as compared with £519,379 for the preceding year, and a net profit, after providing £196,940 for taxation, and £57,729 for depreciation, of £162,269 (against £149,390), to which is added £231,778 brought in, £11,610 proportion of undistributed profits of minority shareholders in subsidiary companies brought forward, taxation over-reserved in previous years, £37,055, and provision for deferred repairs no longer required £1,150, making £443,862. Reserves receive £79,612 and it is proposed to pay an ordinary dividend for the year of 15 per cent (unchanged). The balance carried forward is £253,940.

In his statement issued with the report and accounts, Mr. H. Falk (chairman) says that having regard to future progress, the board has come to the conclusion that additional finance is now required. Particulars of the form in which this will be proposed will be announced shortly. There has been some decline in sales in certain sections, but this has been amply compensated by increases in other departments, largely due to the introduction of new products. The total sales show a gratifying increase, including a further increase in export, creating an all-time record. Regarding the current year, home sales are making satisfactory progress and the export section is well in advance of the same period of last year.

Richard Crittall & Co., Ltd.—The consolidated accounts for the period 1st January, 1948, to 9th June, 1949, show an income from trade investments of £176, income tax recoverable or overprovided £28,172, and profits, less losses on sale or valuation of fixed assets, £203,587, against which is brought in a debit of £621,255. To trading losses and loss arising out of the liquidation and discontinuance of group companies, including claims for breach of contract and under guarantees, including overseas development expenditure written off, £1,013,816. After meeting various charges, there is a loss carried to reconstruction account of £1,454,730. The reconstruction account shows transfers of reserves at 1st January, 1948, totalling £252,293, which with additional E.P.T. post-war refund, £5,595; liabilities to unsecured creditors cancelled in accordance with scheme of arrangement—Richard Crittall £604,628, Grierson £64,870, Air Ducts £57,525—and reduction in issued share capital of Richard Crittall sanctioned by Court £500,000, makes £1,484,911. From this is deducted the loss of £1,454,730, and reconstruction expenses, £7,133, leaving a surplus of £23,048 carried to capital reserve in the parent company.

The consolidated accounts for the period from 10th June, 1949, to 30th June, 1950, show trading profits of £45,481, income from trade investments £2,686, and interest on loans and deposits of £809, making £48,976. The group net profit is £36,785, of which £7,612 is retained in subsidiary and £29,173, applicable to the parent company, is carried forward.

Stothert & Pitt, Ltd.—In the course of his speech at the annual meeting held on 27th October, Sir Llewellyn T. G. Soulsby (chairman), said that during the past year they had been able to maintain their production for the export market, and in spite of exchange difficulties they were continuing to secure a satisfactory proportion of export work. They still had a very substantial order book of export and high priority work and many important orders for both home and overseas were in prospect. Consent of the Capital Issues Committee had now been obtained to the issue of an additional 100,000 ordinary shares of £1 each by way of capital bonus to ordinary shareholders in the proportion of one new share for every three existing ordinary shares.

The Calcutta Tramways Co., Ltd., held its annual meeting on 20th October, Mr. D. E. Webb (deputy chairman) presiding. Mr. Webb has since been elected chairman of the company in succession to the late Sir Geoffrey Clarke. In the course of his speech Mr. Webb said that he was shortly going to Calcutta to continue the direct negotiations with the Government on certain proposals connected with the future of the company. Considerable progress had been made with the modernization of the rolling stock. In the current year traffic receipts and expenses had both continued to increase and the general picture for the first seven months of the year was similar to that for last year.

Electric & Musical Industries, Ltd., in a preliminary statement, reports a group profit for the year ended 30th June last of £470,301, as compared with £670,402, and a net profit of £342,809 (against £346,720). The trading profit includes non-recurring items and items relating to previous periods amounting to £160,000. The profits are struck after pro-

viding £201,499 for taxation and after taking to profit £74,007, provision for taxation now released. It is proposed to pay an ordinary dividend for the year of 6 per cent and a bonus of 2 per cent (both unchanged). The group's carry-forward is £491,893 (against £463,241 brought in). The net profit of the parent company is £145,750 (against £206,250 for the preceding year).

John I. Thornycroft & Co., Ltd., propose to pay a final ordinary dividend of 12½ per cent (against 10 per cent), which with a bonus of 7½ per cent (same) makes the total distribution for the year 25 per cent (against 22½ per cent).

Drake & Gorham, Ltd., report a group profit for the year ended 30th June last, after providing £12,100 for taxation, of £14,158, as compared with £21,836 for the preceding year. The ordinary dividend for the year is unchanged at 5 per cent.

The Anglo-Portuguese Telephone Co., Ltd., has declared an interim dividend of 3 per cent (same) on increased capital.

The London Electric Wire Co. & Smiths, Ltd., is again paying an interim dividend of 4 per cent.

W. Canning & Co., Ltd., have declared an interim dividend of 5 per cent (same).

New Companies

Halmatic, Ltd.—Registered 18th October. Capital £1,000. Manufacturers of and dealers in light electrical equipment, plant, machinery, etc. Subscribers : D. J. Ross & N. E. Fitzsimon. Regd. office : 8, Southampton Place, Bloomsbury Square, W.C.1.

West Wickham Electric, Ltd.—Registered 18th October. Capital £2,500. Manufacturers of, agents for and wholesale and retail dealers in domestic, household and general electrical and other equipment and appliances, including washing and cleaning machines, wringers, mangles, refrigerators, etc. Directors : S. G. Burdick and E. H. Mearns. Regd. office : 98, High Street, West Wickham, Kent.

Electronikos, Ltd. — Registered 18th October. Capital £500. Designers, manufacturers, wholesalers and retailers of electronic equipment, hearing aids for the deaf, electrotherapy equipment, public address systems, etc. Directors : J. E. Watson, R. A. Prior, A. E. Wighton and H. S. Gallagher. Regd. office : 7, Coolinge Road, Folkestone, Kent.

J. W. Collins and Sons, Ltd.—Registered 17th October. Capital £1,000. To acquire the business of electrical engineers and contractors and radio sales and repair specialists carried on by J. W. Collins and W. F. Shafer as J. W. Collins and Sons at Hassocks and Keymer, Sussex. Directors : J. W. Collins and W. F. Shafer. Regd. office : 6, Parkmore Terrace, Hassocks, Sussex.

Bankruptcies

H. J. A. Wade and **C. L. Wade,** carrying on business as C. & H. Wade & Co., 40, Dulwich Road, Herne Hill, London, S.E.24, and lately carrying on business at 68, Brixton Water Lane, S.W.2, electrical engineers and contractors.—Application for discharge to be heard on 7th November at Bankruptcy Buildings, Carey Street, London, W.C.2.

C. S. Lewis, 347, Eastern Avenue, Ilford, Essex, electrical contractor and retailer.—Discharge suspended for eighteen months; to be discharged as from 18th March, 1952.

H. Walby, 86, Hill Rise, Richmond, Surrey, electrical engineer.—Receiving order made 19th October on a creditor's petition.

H. H. Baron, 84, Duckworth Street, Darwen, Lancs, electrician.—Application for discharge to be heard on 13th November at the County Court House, 64, Victoria Street, Blackburn.

J. S. Anderson, trading as Electronic Services, "Nearavon," Salisbury Street, Fordingbridge, Hants, radio and electrical engineer.—Trustee, Mr. A. H. Brown, The Square, Fordingbridge, appointed 21st October.

J. Barnett and **M. Barnett,** trading as Barnett Supplies Co., 102 and 104c, Cranbrook Road, Ilford, radio, electrical and television dealers and contractors.—Last day for receiving proofs for dividend 10th November. Trustee, Mr. N. W. Osborne, 11-12, Finsbury Square, London, E.C.2.

J. T. Southwood, 13, Brandreth Road, Compton, Plymouth, lately carrying on business at Belgrave Garage, Mutley, Plymouth, electrical engineer.—Last day for receiving proofs for dividend 10th November. Trustee, Mr. F. B. Goodman, 24, Lockyer Street, Plymouth, Official Receiver.

PRODUCTIVITY CONFERENCE

THE programme is now available of the conference on "Electricity as an Aid to Production" which is to be held at the Institution of Electrical Engineers in London on Wednesday and Thursday, 15th–16th November. Apart from containing full details of the various items on the agenda the programme includes summaries of the five lectures which are to be delivered on motive power in the factory; industrial heating processes; welding applications; the handling and inspection of materials; and lighting, heating and ventilation. Forms of application for tickets of admission to the conference may be obtained from the Secretary of the Institution.

STOCKS and SHARES

EVERY week adds an increasing witness to the amount of spare capital which is available for investment in Stock Exchange securities. Sums of money which not many years ago would have been regarded as staggering, are now subscribed with ease. Borrowers on gilt-edged stock have no difficulty in obtaining all that they want from the public, and, notwithstanding the severe handicap imposed by the transfer-stamp duty of 2 per cent, investment continues to absorb previous issues with consistent appetite. The result is seen, naturally, in a steady improvement in Stock Exchange quotations in all those markets which are more particularly sought by investors in good class shares. Within the last week or two, the demand has quickened noticeably for preference shares. And there is almost a famine in debenture stocks.

The Rising Tide

The printing trade dispute has recently prevented presentation of the monthly tables which follow this article, but comparing to-day's prices with those of three months ago—the last time when the tables were set out—it will be noticed that the main feature is the quite considerable rises that have occurred in the majority of shares. The same tendency has been observable in gilt-edged securities as in that for stocks and shares, and, as noted during the past week or two, British Electricity, London Transport, and similar issues have added substantially to their previous prices.

Ericssons's Bonus

Ericsson Telephones last accounts, issued in March, showed the 20 per cent tax-free dividend to be covered more than six times by available earnings, and a balance-sheet with general reserves of a million, against an ordinary capital of £375,000. On the strength of this position, the price of the shares has since been discounting a better return, sooner or later, for stockholders; and it has been little affected by the company's proposal to distribute, as a capital bonus, one new share for every eight held. With the shares at 47s, the prospective quotation "ex bonus" is about 41s 9d. Assuming the maintenance (as the market hopes) of the present rate of dividend on the larger capital, the yield basis would be equal to £4 5s 2d per cent gross.

Crabtree Electrical Industries

In maintaining the final dividend this month at 12½ per cent, this company continues the unbroken succession of 17½ per cent total distributions paid since its registration fourteen years ago. It was formed then as a holding company, acquiring the control of J. A. Crabtree Ltd., the Walsall manufacturers. Trading profit for the group for the past year showed a useful increase, in the preliminary figures, from £350,000 to £371,000, and, after all charges, covers comfortably twice the amount distributed. The price of the 10s shares at 38s 6d is about the highest of the year, and gives a return of £4 11s per cent.

Company News

H. J. Baldwin's preliminary profits statement shows that the moderate contraction reported a year ago has been more than made good. New capital was issued last August, and, as then forecast, there is no difficulty in repeating the 25 per cent dividend on the larger amount. The present price of 6s 3d for the 2s shares is 9d above the figure at which the new ordinary were offered, and affords a return of 8 per cent on the money. Falk Stadelmann's full accounts, confirming a moderate rise in net income (after tax), are accompanied by a statement presaging an issue of new capital, in a form not yet disclosed. Radio & Television Trust stockholders are told in the annual report that ultimately it may be in their best interests to dispose of the working companies. Meanwhile, there is a heavy interest charge on the overdraft, and preference shareholders cannot look for an early resumption of dividends. Electric & Musical Industries declined to 20s on the year's figures, to 30th June last, showing a drop of £200,100 in the group profit. The dividend and bonus are repeated at 8 per cent.

Miscellaneous Matters

Marryat & Scott 2s ordinary shares are proving a popular newcomer. They have risen to about 5s, against the "placing" price of 4s 6d. The 6 per cent preference shares stand at 21s. Cawnpore Electric £1 ordinary jumped 10s to £4, after the annual meeting, on satisfaction with the figure which the local Government is to pay for the undertaking. The chairman hopes for an early distribution of £3 per cent, with perhaps a further payment of up to £2 to follow.

Steel Bill Influences

The prospective take-over of steel shares to a total value of about £300 millions next February, continues to be regarded as one of the principal influences on Stock Exchange market conditions, and as a source of support to both the gilt-edged and industrial sections over the next few months. So far as the gilt-edged market is concerned, the prospective addition of some hundreds of millions to the amounts of Government stock in issue may be a source of future weakness, aggravated perhaps, by selling on the part of recipients; but, for the present, it is assumed that the market can expect to be kept in good condition for the launching of the Steel stock.

Electrical Investments

Three-Month Price Changes

Company	Dividend Previous	Dividend Last	Middle Price Oct. 27 1950	Rise or Fall	Yield p.c. £	Yield p.c. s.	Yield p.c. d.
Overseas Electricity Companies							
Atlas Elec. ..	2½	3	16/9	+1/9	3	11	8
Calcutta Elec. ..	6†	6†	26/-	+4/6	4	12	4†
Cawnpore Elec. ..	—	—	80/-	+35/-		—	
East African Power	7	7	35/-	+ 1/16	4	0	0
Jerusalem Elec. ..	—	—	13/6	—		—	
Madras Elec. ..	—	—	33/9	+6/3		—	
Nigerian Elec. ..	10	10	30/-	−9d	6	13	4
Palestine Elec. "A"	5†	5†	22/6	+1/-	4	9	0†
Perak Hydro-Elec.	Nil	Nil	11/-	+3/-		—	
Whitehall Inv. Pref.	6	6	23/6	—	5	4	4
Equipment and Manufacturing							
Aberdare Cables(5/-)	15	20	15/-	+4/3	6	13	4
Aron Elec. Ord. ..	15	15	40/-	− 1/8	7	10	0
Assoc. Elec. Ord.	15	15	76/6	—	3	18	6
AutomaticTel.& El.	12½	12½	61/6	+4/-	4	1	6
Babcock & Wilcox	15	15	65/-	+2/-	4	12	4
Baldwin, H. J. (2/-)	25	25	6/3	+6d	8	0	0
British Aluminium	10	10	44/-	+4/6	4	11	0
B.I. Callender's ..	6⅜	6⅜	33/-	+2/6	4	0	10
British Thermostat (5/-)	25	30	32/-	+3/3	4	13	9
British Vac.Cleaner (5/-)	20	20	12/-	+6d	8	6	8
Brush Ord. (5/-) ..	10	10	6/3	+1/-	8	0	0
Burco (5/-) ..	35	35	22/-	+2/-	7	19	1
Chloride El. Storage	20	12½*	57/6	+5/-	3	9	6‡
Cole, E. K. (5/-) ..	20	20	17/6	+2/-	5	14	3
Cossor, A. C. (5/-)	Nil	Nil	10/-	+2/-		—	
Crabtree (10/-) ..	17½	17½	38/6	+1/-	4	11	0
Crompton Parkinson Ord. (5/-) ..	22½	22½	12/6	+1/-	4	10	0
De La Rue (5/-) ..	50	50	24/6	+2/-	10	4	2
Decca (1/-) ..	112½	112½	15/6	+2/9	7	5	2
E.M.I. (10/-) ..	8	8	20/-	−6d	4	0	0
Electrical Components (5/-) ..	20	20	11/3	—	8	17	10
Elec. Construction	12½	15	58/9	+ 1/8	5	2	0
Enfield Cable Ord.	7½	7½	31/6	+1/6	4	15	3
English Electric ..	10	10	47/6	+2/-	4	4	2
Ericsson Tel. (5/-)	20†	20†	47/-	+2/-	2	2	7
Ever Ready (5/-)	40	35	29/6	+2/-	5	18	8
Falk Stadelmann	15	15	37/6	+3/9	8	0	0
G.E.C. Ord. ..	17½	17½	82/6	—	4	5	0
General Cables (5/-)	50	38*	15/-	− 1/8	10	0	0‡
Greenwood & Batley	15	15	46/-	+3/6	6	10	5
Hackbridge Cable (5/-)	—	20	14/3	+1/3	7	1	7
HackbridgeHewittic (5/-)	12½	15	15/6	+2/-	4	16	9
Hall Tel. Acc. (10/-)	10	10	15/6	+1/6	6	9	0
Heatrae (2/-) ..	12½	12½	4/-	—	6	5	0
Henleys (5/-) ..	20	20	23/6	+6d	4	7	0
Hoover (5/-) ..	40	45	48/3	+4/3	4	13	6
Intl. Combustion (5/-)	37½	21	17/-	+1/-	4	8	3‡
Johnson & Phillips	15	15	61/3	+ 1/8	4	18	0

Company	Dividend Previous	Dividend Last	Middle Price Oct. 27 1950	Rise or Fall	Yield p.c. £	Yield p.c. s.	Yield p.c. d.
Equipment and Manufacturing (continued)							
Lancashire Dynamo	22½	22½	97/6	+5/-	3	16	10‡
Laurence,Scott(5/-)	12½	12½	14/-	+6d	4	9	3
London Elec. Wire	10	10	51/3	+3/9	3	18	2
J. Lucas	17½	17½	33/3	+2/3	3	9	0‡
Mather & Platt ..	11	11	38/3	+2/6	3	16	10‡
Metal Industries ..	10	10	40/-	−3/3	5	0	0
Mid. Elec. Mfg. ..	35	12½*	56/3	+ 1/16	4	3	0‡
Murex	20	10*	49/6	+4/-	4	0	10‡
Newman Ind. (2/-)	17½	10	4/-	+1/-	5	0	0
Oldham & Son (1/-)	60	30*	5/6	+6d	5	9	1‡
Parsons C. A. ..	12½	15	72/6	+ 5/16	4	2	8
Plessey (5/-) ..	20	20	18/9	+2/6	5	6	8
Pye Deferred (5/-)	25	35	36/3	+5/-	4	16	7
Radio & Tel. (2/-)	—	—	6d	−3d		—	
Revo (10/-) ..	27½	27½	43/3	+3/3	6	7	2
Reyrolle	12½	15	71/3	+2/6	4	4	0
Scophony Baird(1/-)	—	—	1/6	—		—	
Scot. Cable (4/-) ..	30	30	22/6	—	5	6	8
Siemens Ord. ..	7½	7½	31/3	—	4	16	0
Switchgear&Cowans (5/-)	20	20	15/-	—	6	13	4
T.C.C. (10/-) ..	15	15	32/6	− 1/16	4	12	4
T.C. & M. ..	10	9*	40/6	+2/3	3	19	0‡
Telephone Mfg.(5/-)	9	10	11/-	+1/-	4	11	0
Thorn Elec. (5/-)..	20	20	18/9	+ 1/16	5	6	8
Tube Investments	25	25	6 7/16	+ 3/8	3	17	6
Vactric (5/-) ..	Nil	Nil	9/6	+2/-		—	
Veritys (5/-) ..	5	2½	3/6	+6d	3	11	5
Walsall Conduits (4/-)	70	70	56/3	−9d	4	19	6
Ward & Goldstone (5/-)	50	44*	38/6	+3/-	5	4	0‡
Watford (2/-) ..	20	20	6/9	+3d	5	18	6
WestinghouseBrake	14	14	62/6	+ 1/16	4	9	7
West, Allen (5/-)..	10	10*	10/3	+ 1/16	4	17	7
Transport and Communications							
Anglo-Am. Tel.: Pref.	6	5 13/20	92	−3½	6	2	6
Def.	—	—	17	+1		—	
Anglo-Portuguese	8	8	26/-	+6d	6	3	1
Brit. Elec. Traction: Def. Ord. ..	50	32½*	455	+20	4	19	0‡
Cable & Wireless: Ord.	—	—	93	−½		—	
4% Loan	—	—	101¼	+¼	3	18	10
Calcutta Trams ..	6†	6†	36/6	+11/6	3	5	9‡
Cape Elec. Trams	6	4	13/9	− 1/16		—	
Globe Tel. & Tel. Ord.	5†	5†	41/3	−2/-		—	
Great Northern Tel. (£10)	8	7	14	+1	5	0	0
Inter. Tel. & Tel.	Nil	Nil	25	+4		—	
Marconi Marine ..	7½	7½	25/-	+ 1/16	6	0	0
Oriental Tel. Ord.	16	16	46/3	+ 5/16	6	18	10
Telephone Props.	6	7	24/6	+3/3	5	14	3
Tele. Rentals (5/-)	10	10	11/3	+3d	4	9	0

*After capital bonus.
† Dividends are paid free of Income Tax.
‡ Yield adjusted to capital bonus issue.

ELECTRICITY SUPPLY

Tariff Changes in Three Areas
Edinburgh Rejects 132 kV Line Application

LAST week the South Western Electricity Board announced that where the running charge under two-part tariffs is ¾d it will be raised to ⅞d. At the same time, in cases where the charge is more than 1¼d it will be reduced to this price. No change is being made in the fixed charge of two-part tariffs. Lighting flat rates will be raised to 4½d per kWh where they are at present lower than this amount and those over 6d will be reduced to this level. The new charges will take effect from the first meter-reading after 19th November. The South Western Electricity Consultative Council has approved the variations. As an illustration of the effect of the changes, a consumer in Bristol, Plymouth or Exeter using electricity for lighting, cooking, a sink heater and other minor uses, whose quarterly bill at present averages £2 6s, will pay about 5d a week more, while a consumer in Brixham, whose quarterly bill for the same usage at present averages £5 16s, will pay about 2s 6d a week less.

Eastern Area Charges

Variations in tariffs are also proposed by the Eastern Electricity Board, to take effect early in 1951. To meet increased costs the Board requires additional revenue and the changes provide for an increase of £750,000 over the present annual revenue of £25 million. This will not, however, effect the Board's trading position in the current year. The variations also aim at promoting simplification and standardization by removing many anomalies.

It is proposed that the lighting flat rate should be 6d throughout the area, and that meter rents on this tariff should be abolished; that the "unit" charge under the domestic two-part tariff should be raised to ⅞d (where it is already higher there would be no change except that the maximum would be 1d); and that the minimum annual fixed charge should be 48s (the Board accepted a suggestion from the Consultative Council to postpone increasing the charge to £3 and has put forward this modified proposal). Similar changes are proposed with regard to commercial and farming two-part tariffs, and on all domestic commercial and farming two-part tariffs it is proposed to abolish meter rents.

There are still a few places where there are discounts of 2½ or 5 per cent and these would be discontinued, as also would the surcharges in operation in certain places. It is not proposed to standardize industrial tariffs at present, but as those in Luton and Watford are considerably lower than elsewhere it is proposed to abolish the discount which now applies.

At a meeting of the Consultative Council, presided over by Ald. W. J. Bennett, J.P., a report on the tariff changes was submitted by the General Purposes Committee. It was not satisfied that the increase was an immediate necessity and thought that the Board should make application to the B.E.A. for a grant to meet any loss in 1950–51. It considered that the Board should submit to the Council as soon as possible a unified tariff structure to cover each class of consumer and that an opportunity should then be taken to make any necessary increases. The Council decided to adopt the report and make a representation to the B.E.A. on the matter.

London Tariff Revisions

In December, 1949, the London Electricity Board announced reductions in tariffs amounting to £500,000 per annum. The Board now announces further tariff revisions which will involve a net reduction of an additional £300,000 per annum. Reductions are being made to the extent of £413,000 per annum, but these are offset to the extent of £128,000 by the necessity to revise certain uneconomic rates. These revisions, which are all in the direction of ultimate standardization of tariffs, have been fully discussed with the London Electricity Consultative Council. Both commercial and domestic consumers share in the benefits of the reductions.

A further concession is the abolition of rentals for all meters installed to meet the Board's requirements, with the exception of those in respect of prepayment meters and special metering equipment.

The reductions in tariffs and the abolition of meter rentals will take effect after the readings of the meters for the December quarter, but the increases will not operate until after the readings of the meters for next March quarter.

Keadby Development

Consent has been received by the British Electricity Authority from the Ministry of Fuel and Power for the development to its full capacity of the new Keadby power station, Lincolnshire. Authorization is given for the installation of two further 60 MW turbo-

generators, which will bring the total installed capacity of the station up to 360 MW when completed, and two boilers each of an evaporative capacity of 550,000lb of steam an hour. The first set and boiler of the station are expected to be commissioned next year, and further units will follow in subsequent years, the station being due for completion by 1955.

Overhead Lines Refused

Although it was told that an underground cable would cost five or six times more than an overhead line, Edinburgh Corporation Planning Committee recently rejected an application by the British Electricity Authority to carry a 132 kV supply by overhead line from Currie to Gorgie and Telford Road. The Lord Provost, Sir Andrew Murray, said that it was the policy of the Committee that in built-up areas, or in areas likely to become built-up, cables should be underground. He was more than ever convinced that this policy should be continued, but the ultimate decision rested with the Ministry of Fuel. On behalf of the Authority it was stated that an underground cable would cost between £300,000 and £400,000. Experts were satisfied that the overhead line was the more economical and more satisfactory from a technical point of view.

Cookers at Market Harborough

Hearing that Market Harborough (Leics) Urban District Council planned to provide only gas cookers on the new southern housing estate, the East Midlands Electricity Board complained to the Council that it was "too gas-minded" and did not give electricity a fair deal. The Board said it was unfair to expect mains to be laid to the estate for lighting purposes and that no chance should be given to the Board to supply power for cookers. The Council is now to consider a recommendation of the Housing Committee that the first forty houses on the estate shall be fitted with gas cookers but that tenants of the remaining houses shall be allowed to choose between gas and electric cookers.

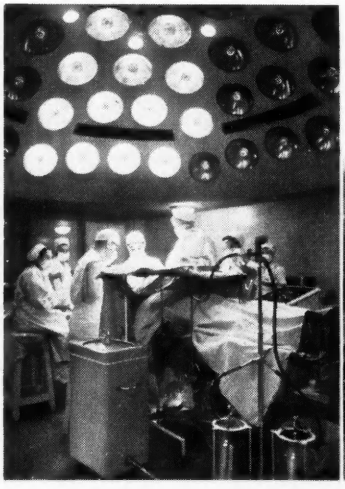
Electrical Installations

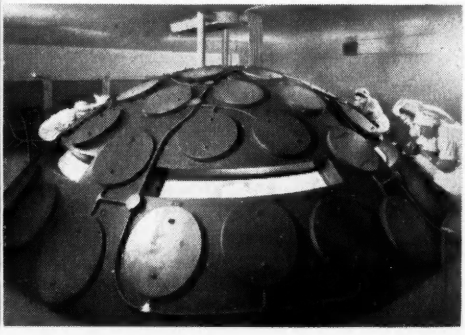
Felling (Co. Durham) U.D.C. has been informed that the Ministry of Health is now prepared to consider the installation of electric lighting in place of gas in houses on the Stoneygate Lane estate.

Hospital Theatre Lighting

OPERATING theatres of Paris hospitals are being re-equipped with a new lighting system. This is known as the "Blin Arch," which contains 61 elliptical projectors. The first to have the system is l'Hôpital de la Pitié. Each projector in a large dome is placed in a special position and at a special angle. The switching permits the use of the projectors in groups of about a dozen. It is thus possible to direct the light on to a particular part while the remainder is in shadow. Observation ports are provided in the dome so that nurses and students can see operations from a gallery around it.

These projectors were designed by the photometric laboratories of la Compagnie des Lampes. The lamps are rated at 24 V 72 W and have specially stout filaments.





Left: A group of projectors in use. Right: Above the dome; nurses watching operation

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

7354. British Thomson-Houston Co., Ltd.—Preparation of powdered metals and/or metal carbides for extrusion. 20th April, 1944. (646772.)

13287. Marconi's Wireless Telegraph Co., Ltd.—Radio signal recording system. 11th July, 1944. (646699.)

20102. Marconi's Wireless Telegraph Co., Ltd.—Radio range-finding and locating systems. 17th October, 1944. (646700.)

1946

1528. Philco Products, Inc.—Radio detection and ranging apparatus. 16th January, 1946. (646776.)

23543. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Dry-shaving apparatus. 8th August, 1946. (646778.)

36761. Potter, E. (Williams, R. G.).—Colour lighting apparatus. 13th December, 1947. (646642.)

1947

209. Wardle Engineering Co., Ltd., and Ogley, D. H.—Reflector fittings or lanterns for electric lamps. 31st January, 1948. (Cognate application 27693, 16th October, 1947.) (646703.)

6545. Radio Corporation of America.—Beam-deflecting circuits for cathode-ray tubes. 8th March, 1947. (646779.)

8102. Westinghouse Electric International Co.—Electron-discharge devices. 25th March, 1947. (646704.)

9878. Russell, G.—Thermionic valve amplifiers. 24th May, 1948. (646647.)

10963. Colonial Radio Corporation.—Noise reduction system for radio receivers. 24th April, 1947. (646920.)

10985. Standard Telephones & Cables, Ltd., and Drake, C. F.—Metallization of non-metallic surfaces. 23rd April, 1948. (646921.)

12461. Westinghouse Electric International Co.—Control systems for alternating current motors. 8th May, 1947. (646924.)

15161. Kreglewski, A.—Method of protected arc-welding and arrangements for working according to this method. 9th June, 1947. (646785.)

17460. Planiol, R.—Methods of and apparatus for magnetic separation. 2nd July, 1947. (646790.)

17641. White, E. L. C., and Smith, J. B.—Control circuits for electrical oscillation generators. 8th June, 1948. (646929.)

18483. General Electric Co., Ltd., and Levy, M. M.—Modulators for multi-channel signalling systems. 29th June, 1948. (646792.)

20594. Ruben, S.—Electric primary cell and battery. 30th July, 1947. (Cognate applications 20595, 21st May, 1946, and 20596, 5th June, 1946.) (646799.)

20755. Ruben, S.—Alkaline primary cells. 31st July, 1947. (Cognate applications 20756, 5th June, 1946, and 20757, 11th July, 1946.) (646800.)

21075. Sylvania Electric Products, Inc.—Fluorescent material. 1st August, 1947. (646802.)

21078. Sylvania Electric Products, Inc.—Lamp coating apparatus. 1st August, 1947. (646803.)

22086. Sylvania Electric Products, Inc.—Tubular electric-discharge lamps. 14th January, 1948. (646716.)

24653. Standard Telephones & Cables, Ltd., and Leno, J. A.—Electrical heating panels. 3rd September, 1948. (646940.)

26322. Sylvania Electric Products, Inc.—Headers for radio tubes. 29th September, 1947. (646720.)

26442. Thomas, G.—Sheathings for protecting lagging on pipes or tubes or insulation on electrical cables, and analogous insulation. 1st October, 1948. (646810.)

27407. Standard Telephones & Cables, Ltd., Bates, E. F., Bray, F. H., and Lowry, L. P.—Closed circuit electric loop signalling systems. 8th October, 1948. (646655.)

30823. British Thomson-Houston Co., Ltd.—Refrigerating systems. 20th November, 1947. (646814.)

31547. General Electric Co., Ltd., and Hubbolds, S.—Electric lighting fittings. 2nd November, 1948. (646816.)

1948

2536. Bata, Narodni Podnik.—Systems for removing hoarfrost from the overhead conductors of electric railways. 28th January, 1948. (646845.)

2584. British Thomson-Houston Co., Ltd.—Method of providing an electric insulator with a resistance coating. 28th January, 1948. (646846.)

5010. Standard Telephones & Cables, Ltd.—High-voltage selenium rectifiers and manufacturing process. 20th February, 1948. (646852.)

5614. Soc. Electro-Mecanique de L'Aveyron.—Electric brakes. 25th February, 1948. (646853.)

7203. Westinghouse Electric International Co.—Resinous semi-conducting materials including conductive carbon. 9th March, 1948. (646970.)

8019. Marconi's Wireless Telegraph Co., Ltd., and Stokes, V. O.—Electrical coupling circuit-arrangement. 29th October, 1948. (646739.)

8411. Westinghouse Electric International Co.—Manufacture of magnetic cores for electric-induction apparatus. 22nd March, 1948. (646859.)

12770. Standard Telephones & Cables, Ltd., Hough, G. H., White, C. de B., and Cinderey, N. S.—Electric relaxation oscillators. 6th May, 1949. (646749.)

13433. Automatic Electric Laboratories, Inc.—Automatic telephone systems. 18th May, 1948. (646880.)

13594. Shell Refining & Marketing Co., Ltd., and Robson, R. C.—Cathode-ray oscilloscopes for indicating pressure variations, mechanical vibrations and other phenomena. 19th May, 1948. (646751.)

16882. Standard Telephones & Cables, Ltd., and Braaten, A.—High-voltage testing equipment. 17th June, 1949. (646756.)

17178. Dehn, S. G. (Breuer Electric Manufacturing Co.).—Suction cleaners. 25th June, 1948. (646893.)

17545. Maple & Co., Ltd., Hiscock, E., and Williams, H.—Electric-discharge tubes. 24th June, 1949. (646894.)

18889. Trix, Ltd., Prior, F. J., and Alton, W.—Terminals for electric leads. 14th July, 1948. (646975.)

19192. Airmec Laboratories, Ltd., Simonds, J. C., and Membry, E. J.—Electrical insulation and leakage-testing apparatus. 14th June, 1949. (646757.)

19541. General Electric Co., Ltd., and Fairweather D. W.—Plug-and-socket electric couplings. 21st July, 1949. (646663.)

20366. Metropolitan-Vickers Electrical Co., Ltd., Burch, C. R., and Willcocks, M. J.—Optical measurement and/or calibration of tubular surfaces. 28th July, 1949. (646760.)

21405. Westinghouse Brake & Signal Co., Ltd., Stevens,

S. A., and Duckitt, H.—Circuit-arrangements for the control of a direct current relay. 7th July, 1949. (Cognate application 5821, 3rd March, 1949.) (646901.)

21920. General Electric Co., Ltd., Buckle, G. W. V., and Turner, H. C.—Control units for thermostatic and other electric switches. 19th August, 1949. (646903.)

22244. Crabtree & Co., Ltd., J. A., and Hill, W. E.—Electric tumbler switches. 24th August, 1949. (646666.)

22539. British Thomson-Houston Co., Ltd.—Control apparatus for electric blankets and the like. 26th August, 1948. (646905.)

27796. Compagnie Générale d'Electricité.—Composite cable for telecommunication with low crosstalk between coaxial pairs. 26th October, 1948. (646672.)

27825. General Electric Co., Ltd., Breadner, R. L., and Douglas, R. W.—Crystal contact devices and methods of manufacture thereof. 25th October, 1949. (646674.)

27857. Cole, Ltd., E. K., and Evans, J. N. I.—Manufacture of low pressure mercury vapour lamps comprising a vitreous envelope internally coated with a fluorescent powder. 5th October, 1949. (646676.)

27892. Firestone Tyre & Rubber Co., Ltd., and Collins, J. B.—Methods of and means for dissipating the electrostatic charge which accumulates on a vehicle in use. 27th October, 1949. (646679.)

27982. Babcock & Wilcox, Ltd.—Pulverizers. 28th October, 1948. (646686.)

27983. Babcock & Wilcox, Ltd.—Vapour-generating and superheating units. 28th October, 1948. (646687.)

28047. Trist & Co., Ltd., R., and Clarke, A. G.—Voltmeters. 20th October, 1949. (646692.)

28273. Healey, T. G. P.—Electric storage battery testers. 26th October, 1949. (Addition to 573267.) (646907.)

Amended Specification

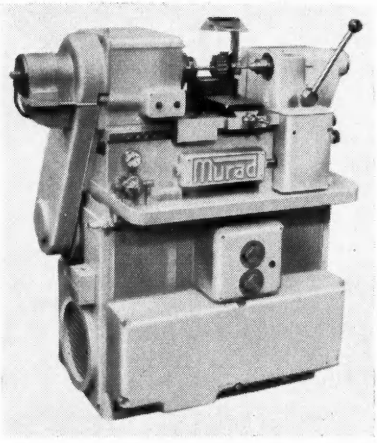
626114. Metals & Controls Corporation.—Protective arrangements for polyphase electrical apparatus.

Commutator Turning

New Automatic Machine

IN order to step up the turning of commutators used in domestic appliance motors Murad Developments, Ltd., have designed and built for Hoover, Ltd., an automatic machine which, apart from satisfying production requirements, is likely to result in the possible saving of four operators.

To operate this machine the end of the rotor shaft is inserted in the headstock collet after which the tailstock lever is moved forward to bring the centre in contact with the work piece. Further movement presses the start button and sets the spindle in motion. The tool then approaches the work piece, rapidly slows down to cutting feed and when it is clear of the work the spindle stops and the tool withdraws under rapid return and stops. The lever controlling the tailstock centre is then moved back, which first opens the collet, further movement withdrawing the centre from the work which is then unloaded and the operation repeated.



Commutator turning machine made for Hoover, Ltd., by Murad Developments, Ltd.

The function of the machine is based on a main motor drive to the main spindle, and a separate drive to the feed mechanism. The motors are controlled by oil immersed contactor switchgear housed in the lower box guards while the upper guard contains the isolator and a switch which enables the saddle to be inched in either direction along the bed. Both motors are equipped with electric brakes to bring them to a full stop as required by the sequence of movements of the slide.

The cycle of movement on the tool slide is controlled by a cam driven by a train of pick-off gears from the feed motor. This enables variations to be made in the quick approach and feed relationships as well as the cycle of operations.

Provision is made for adjusting the depth of cut, a micrometer dial being provided for this purpose, and fine adjustments along the axis of the bed are available through the auxiliary slide mounted on the main cross-slide. The height of the tool in the tool post can also be adjusted.

A further refinement is a transparent swinging "Perspex" guard, which automatically moves into position at the start of the cycle and withdraws at the end to protect the operator.

All patterns and castings were supplied by Technaloy, Ltd., and motors by British Bronson, Ltd., both associate companies of Murad Developments, Ltd.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.

Australia.—New South Wales.—24th January. Department of Railways. Complete 1,500 V overhead conductor equipment for Parramatta-Lithgow railway electrification. (C.R.E. (I.B.) 67914/50. Ten/1763.)*

Bedfordshire.—28th November. County Education Committee. Electrical installation at Pearcey Road C.P. school, Bedford. (See this issue.)

Belfast.—8th December. Electricity Department. Vertical-spindle centrifugal drainage pumps for Harbour power station. (See this issue.)

Belgium.—13th November. Belgian State Railways. Bi-metal cables for anchoring overhead lines. (C.R.E. (I.B.) 67386/50. Ten/1777.)*

New Zealand.—14th November. Post and Telegraph Department. 4,521 secondary lead-acid cells. (C.R.E. (I.B.) 68309/50. Ten/1790.)* 23rd November. Switchboard wire. (C.R.E. (I.B.) 68410/50. Ten/1787.)*

Pakistan.—21st November. Department of Supply and Development. Switchboard equipment, cables and transformers for Chittagong power station. (C.R.E. (I.B.) 68222/50. Ten/1786.)*

Saffron Walden.—17th November. Town Council. Installation of electric wiring in eighteen houses being erected at Sheds Lane. Particulars from the borough surveyor, Municipal Offices.

Sedgley.—14th November. U.D.C. Street lighting equipment. (See this issue.)

South Africa.—23rd November. Department of Posts and Telegraphs. 2,000 timemeters. (C.R.E. (I.B.) 68500/50. Ten/1793.)* 14th December. 100,320 yds of indoor cable, P.V.C. insulated and sheathed. (C.R.E. (I.B.) 68502/50. Ten/1791.)*

15th November. Cape Town City Electricity Department. 660 V cables. (C.R.E. (I.B.) 68078/50. Ten/1778.)*

Stockport.—24th November. General Purposes Committee. Supply and erection of 200 lighting columns and 200 mercury-vapour lanterns. (See this issue.)

ORDERS PLACED

Birkenhead.—Corporation Education Committee. Electrical installation in connection with the extensions and alterations to the Kirklands secondary school (£1,126).—Fox & Co. (Childwall), Ltd.

London.—Chelsea.—Borough Council Housing Committee. Recommended. Electrical work at Sir Thomas More estate (£9,360).—Altass Electric Co.

Westminster.—City Council Housing Committee. Extension of existing contract to cover the installation of electric lighting in the remaining 192 flats in the Regency Street dwellings (£3,825); Wiring for lighting and for power, of Walden House (£2,246).—Belshaw & Co., Ltd.

L.C.C. Electrical installation at Ensham School, Tooting.—Powerlite Electrical Installations, Ltd.

Wallasey.—Corporation Education Committee. Electrical installation at Wallasey Technical Institute (£2,377).—F. H. Ashworth.

Walsall.—Children's Committee. Electrical work at Hamerwich House (£449).—Birch & Evans.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aldershot.—Public library, borough surveyor, Municipal Buildings.

Amlwch.—Houses (28), Hills Works site; U.D.C. surveyor.

Ashton-under-Lyne.—Houses (60), Crowhill; G. Wimpey & Co., Ltd.

Ayr.—Houses (100), Forehill; Scottish Special Housing Association, Ltd., 15, Palmerston Place, Edinburgh.

Bettws-y-Coed.—Houses (12), Gethin site, for U.D.C.; Williams Bros, Denbigh Street, Llanrwst.

Bradford.—Houses (48), Buttershaw estate; city architect, Margaret McMillan Training College, Trinity Road; B. Engle, architect, 8, New Square, Lincoln's Inn, W.C.2.

Brighton.—Dwellings (189), Parkside Estate extension, for T.C.; borough engineer.

Burnley.—Police headquarters and magistrates' courts; Bradshaw, Gass & Hope, architects, Silverwell Street, Bolton.

Cardiff.—Grammar school for boys, Colchester Avenue; Sir Percy Thomas & Son, architects, 10, Cathedral Road.

Chesterfield.—Offices and garage extensions; Kennings, Ltd., Church Lane.

Coventry.—Special school, Whitley Abbey estate; Loveday & Davis, architects, 2a, Lawrence Sheriff Street, Rugby.

Croydon.—Houses (170), New Addington estate; borough engineer.

Cuckfield.—Houses (50), Balcombe, for R.D.C.; A. Hutchings, surveyor, Boltro Road, Haywards Heath.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

Easington.—Conversion of hostel into housing accommodation for 70 families; R. H. Lumsden, R.D.C. surveyor.

Edinburgh.—Physiotherapy department at Deaconess Hospital; A. McRobie, architect, Hospital Board, 6, Cambridge Street.

Enfield.—Factory extensions; Chase Non-Ferrous Metal Co., Ltd., Genotin Road.

Garstang.—Houses (30), Smallwood Hey site; U.D.C. surveyor.

Godalming.—Extensions to nurses' home, King George's Sanatorium for Sailors, for South West Metropolitan Regional Hospital Board; Thornton, Firkin and Partners, architects, Fitzhardinge Street, London, W.1.

Grays.—Offices for National Assistance Board and Inland Revenue Dept; S. Cronin & Sons, builders, Britannia Road, Warley.

Hampshire.—Schools at Hamble and Kings Worthy; county architect, The Castle, Winchester.

Hereford.—Offices, Holmer Road; Saville Tractors, Ltd., Mortimer Road.

Keighley.—Works extensions for Goulbourne Manufacturing Co., Ltd., Goulbourne Street; W. T. Pearson, Ltd., builders, Sheepscar Grove, Leeds.

Leamington Spa.—Factory, Queensway industrial estate; Kigass, Ltd., Kigass House, Regent Grove.

Lichfield.—Houses & bungalows (80), Alrewas, Boney Hay and Burntwood, for R.D.C.; A. T. & B. Butler, architects, 14, Waterloo Road, Wolverhampton.

Llandudno.—Dwellings, Conway Road for U.D.C.; P. T. Griffiths, Treherne Bryn, Lupas Road, Llanrhas (14 houses); McNiel & Co., Llandudno (6 flats).

London.—SOUTHWARK.—Flats (18), Pelier Street; borough engineer.

Macclesfield.—Houses at Ivy Road estate:—H. Owen & Son, Ltd., Poynton, Stockport (40 houses); Bamford Bros., Ltd., Bollington (8).

Maesteg.—Houses (64), Turberville estate; U.D.C. surveyor.

Maldon (Essex).—Nurses' home (£19,800), St. Peter's Hospital; North East Metropolitan Hospital Board, 11, Portland Place, W.1.

Manchester.—New garden city at Wythenshawe to be started in 1951; city architect.

Hostel for Y.M.C.A.; J. Gerrard & Sons, Ltd., Swinton, nr. Manchester.

Mansfield.—Infants' school, Eakring Road; H. Baggaley, Ltd.

Middlesbrough.—Second stage of the Stainsby secondary school scheme; S. W. Milburn and Partners, architects, Esplanade, Sunderland.

Northampton.—Shops (16), maisonettes (14), flats (8), etc., Park Square, King's Heath; borough architect, Guildhall.

Nottingham.—Technical college, Goldsmith Street; C. Howitt & Partners, architects, St. Andrew's House, Mansfield Road.

Oldham.—Houses (132) and 18 bungalows, Fitton Hill estate; Unit Construction Co., Ltd., Knutsford, Cheshire.

Oswestry.—Houses (30), Shrewsbury Road; E. G. Gittins & Sons, Ltd.

Penrith.—Conversion of part of Armathwaite Castle into six flats; Isaac Armstrong and Sons, builders, Low Hesketh, Cumberland.

Alterations, Newton Rigg Farm School, for the Cumberland and Westmorland Agricultural E.C. (£20,000); county architect, Carlisle.

Plymouth.—Flats (20), Toronto Court, Penlee; city architect.

Reading.—Block of flats, Gosbrook Road; James & Bywaters, architects, 5, Bloomsbury Street, W.C.1.

Reconstruction of factory; Huntley & Palmer, Ltd., Kings Road.

Rothamsted (Herts).—Laboratory buildings at Experimental Station (£90,000), for Lawes Agricultural Trust; secretary, Rothamsted Experimental Station, near Harpenden.

Salford.—Flats (66), rear of Chapel Street; city engineer.

Seaham.—Houses (16), Westlea estate, for the U.D.C.; Tomlin and Son, builders, Stewart Street.

Shardlow.—Pumping stations, purification works, etc., for R.D.C.; Elliott & Brown, engineers, Stanley House, Pelham Road, Nottingham.

Smethwick.—Dwellings (36), Brandhall and Bleakhouse Road site; borough surveyor.

Southend-on-Sea.—Houses (200), Shoebury site; borough engineer.

Staffordshire.—Youth employment bureaux, Sedgley, Cannock and Wednesbury, for C.C.; A. C. H. Stillman, county architect, Lichfield Road, Stafford.

Stalybridge.—Houses (50), Buckton Vale estate; W. G. West & Sons, Ltd., Stockport.

Stockport.—Erection of Vale Road secondary school; Moston Brick & Building Co., Ltd., Manchester.

Stretford.—Flour Mill, warehouse, &c., Trafford Wharf Road; Hovis Ltd., Vauxhall Bridge, London, S.W.1.

Surbiton.—Factory building; W. Platt & Sons, Ltd., Davis Road.

Sutton & Cheam.—Dwellings (32), White House site, High Street, Cheam; borough surveyor, High Street, Sutton, Surrey.

Swansea.—Flats (44), New Street; borough architect, The Guildhall.

Welding Congress

AN International Welding Congress is being held in London and Oxford in July next year. It will include the annual meeting of the International Institute of Welding and its various Commissions, and is being sponsored in this country by the Institute of Welding, the British Welding Research Association, the British Acetylene Association, the Welding Sections of the British Electrical and Allied Manufacturers' Association and the Sheet and Strip Metal Users' Technical Association. The president of the Reception Committee is Sir William Larke, K.B.E.

The Congress will open in London on Saturday, 14th July, and will be transferred on the following day to Oxford, where three colleges, Christ Church, Oriel and Somerville, will accommodate the visitors. Meetings of the fourteen technical Commissions of the Institute will occupy the first two days, and in the second part of the week there will be three open sessions for the presentation and discussion of papers. A full programme of social functions is also being arranged.